1998

PRODUCT SELECTION GUIDE

HARRIS SEMICONDUCTOR

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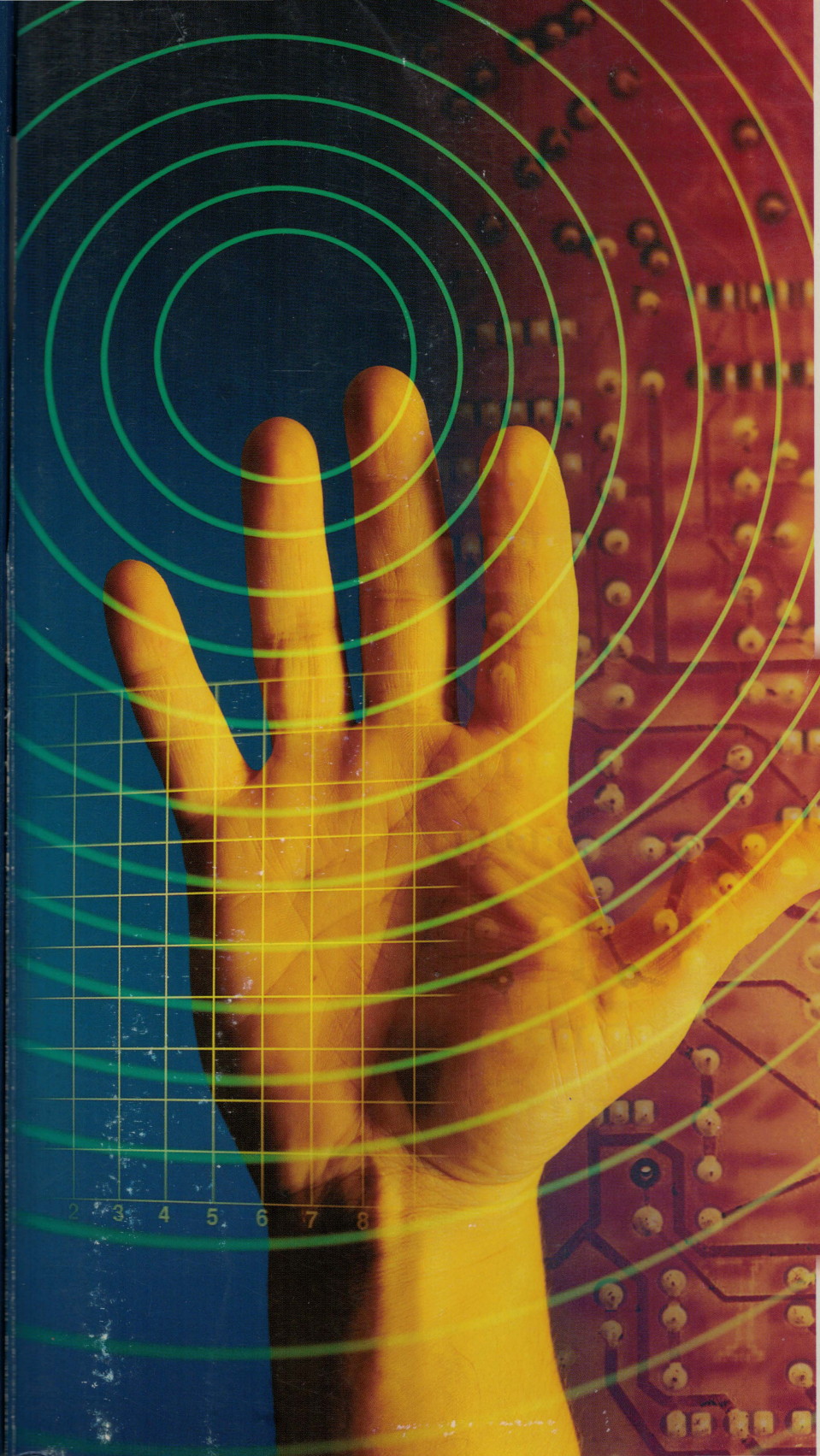

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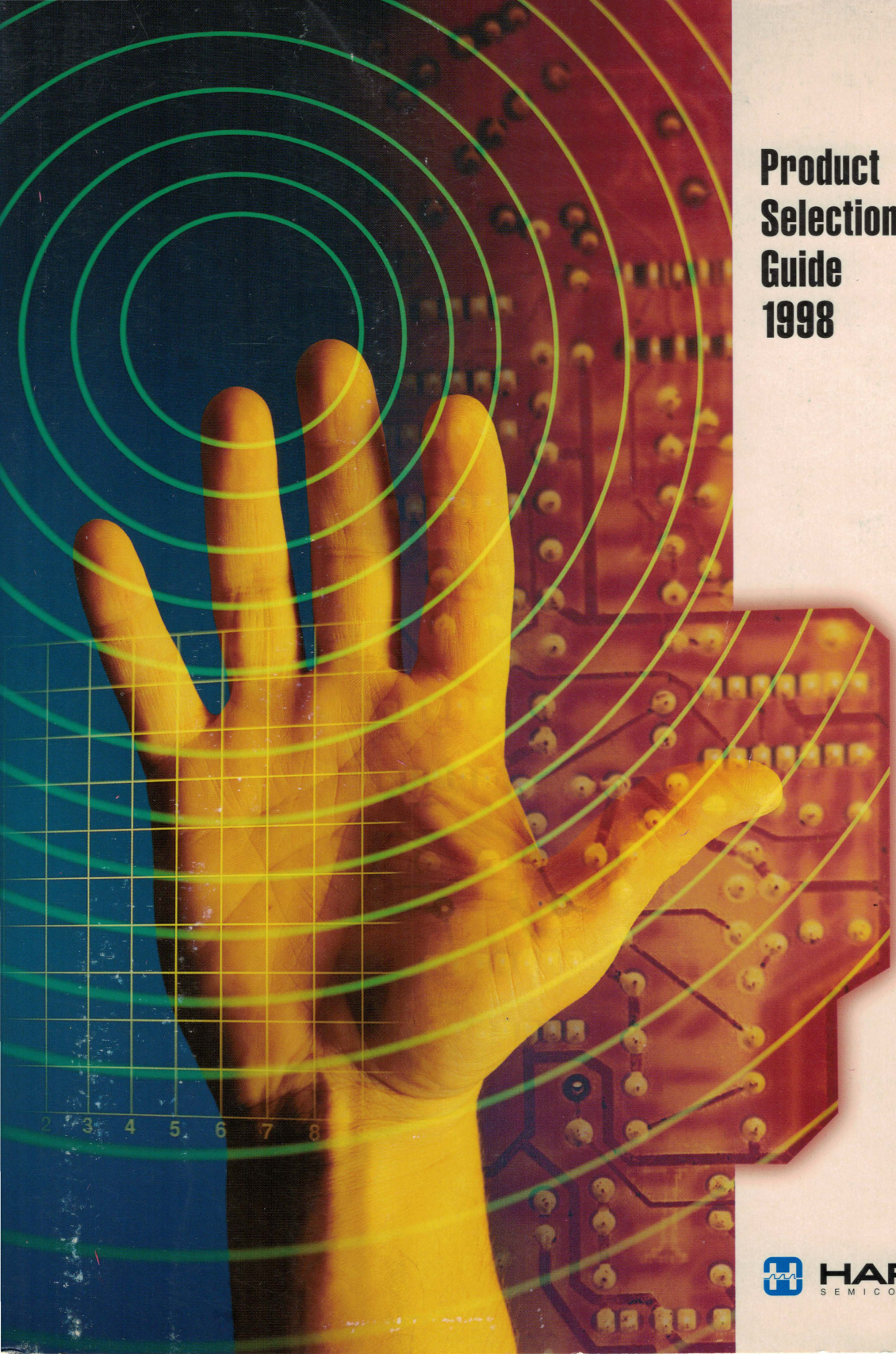
HARRIS SEMICONDUCTOR



Product Selection Guide 1998

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About Harris' Product Selection Guide

This Product Selection Guide contains the full line of Harris Semiconductor products. The guide is divided into 18 sections as listed in the Table of Contents.

To . . .	See . . .
Look up Data on a Base Part Number	the complete list of Harris' products, Section 2. Use this section to find the Product Selection Guide page containing product data, the file #, and the data book containing the data sheet.
Select a Product Function	the Device Category List (page vi), or the Table of Contents (page iii). These pages are used to identify which section contains a specific family of products.
Cross-Reference Military and Space	Military and Space, Section 13. This section cross-references standard product marketing numbers and Hi-Rel offerings.
Determine Pricing and Availability	Sales Offices, Representatives, and Distributer Listing, Section 18

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PRODUCT SELECTION GUIDE

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Device Category Listing

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2NXX	8,13	Power Transistors, Military and Space	MOSFETs
5962	13	Military and Space	SMDs
77-90	13	Military and Space	SMDs
AC, ACS	13	Military and Space	Rad Hard Logic
AD	4	Data Acquisition	ADI Converters
ADC	4	Data Acquisition	A/D Converters
BUZ	8	Discrete Power	N-Channel MOSFETs
CA	4, 13	Data Acquisition, Military and Space	A/D Converters
CA	7, 13	Intelligent Power, Military and Space	Power Regulators/Drivers
CA	3, 13	Linear, Military and Space	Op Amps
CD2XXX	6	Telecom	Cross Point Switches
CD4XXX	12, 13	Digital, Military and Space	Logic
CD54/74XXX	12	Digital	Logic (HC/HCT), (AC, ACT), (FCT)
CD54	13	Military and Space	Logic (HC/HCT), (AC, ACT)
CDP18XX	11	Digital	Microprocessors
CDP18Xx	13	Military and Space	Peripherals
CDP6XXX	11	Digital	Microcontrollers and Peripherals
C/IX80/82CXX	11	Digital	Microprocessors, Peripherals
MX80/82CXX	13	Military and Space	Microprocessors, Peripherals
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FRX, FSX	13	Military and Space	Rad Hard MOSFETs
HA	3, 13	Linear, Military and Space	Op Amps
HC	6, 13	Telecom, Military and Space	Telecommunications
HCS, HCTS	13	Military and Space	Rad Hard Logic
HD	11, 13	Digital, Military and Space	Uarts, Data Bus ICs
HFA	3, 13, 15	Linear, Communication , Military and Space	Op Amps, Communications
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HI	4, 13	Data Acquisition, Military and Space	Switches, Converters, and MUXs
HIN	4	Data Acquisition	RS-232 Interface Circuits
HIP	7	Intelligent Power	Power ICs
HIP7030XX	7	Intelligent Power	Microcontrollers
HM	11, 13	Digital, Military and Space	Memory
HMP	14	Multimedia	Multimedia
HMA/U	5, 13	Digital Signal Processing, Military and Space	Bit Multiplier
HS	11	Digital	ARINC

Device Category Listing

PART NUMBER PREFIX	SECTION	SECTION DESCRIPTION	PRODUCT DESCRIPTION
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HV	7, 13	Intelligent Power, Military and Space	Power ICs
HSP	5, 13, 15	Digital Signal Processing, Military and Space	Digital Signal Processing
ICL	4	Data Acquisition	A/D Converters
ICL	7, 13	Intelligent Power, Military and Space	Power Converters
ICL	3, 13	Linear, Military and Space	Op Amps
ICM	4, 13	Data Acquisition, Military and Space	Timers and Display Drivers
ICM	11	Digital	Time Base Generators
IH	4, 13	Data Acquisition, Military and Space	Analog Switches and MUXs
IRXX	8	Discrete Power	MOSFETs
JM38510/	13	Military and Space	JAN/Sheets
LM	3	Linear	2nd Source Parts
MCTX	8	Power Transistors	MOS Control Thyristor
MWS	11	Digital	RAM
RFXX	8	Power Transistors	MOSFETs
RHRXX	9	Rectifiers	Diode
RLXX	8	Power Transistors	MOSFETs
RTX	13	Military and Space	Microcontrollers
RURXX	9	Rectifiers	Diode
SGT	10	Transient Suppressors	Transient Suppression
SP	7, 13	Intelligent Power, Military and Space	Electronic Protection Arrays
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Check our world wide web site for the most current documentation.

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New Products from Harris Semiconductor

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CDP68HC05C16B,CDP68HCL05C16B, CDP68HSC05C16B	8-Bit Enhanced Microcontroller Series	4249
CDP68HC05P1B,CDP68HCL05P1B, CDP68HSC05P1B	8-Bit Enhanced Microcontroller Series	4408
CDP68HC05J4B, CDP68HCL05J4B, CDP68HSC05J4B	8-Bit Enhanced Microcontroller Series	4248
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DG406, DG407	Single 16-Channel/Differential 8-Channel, CMOS Analog Multiplexers	3116
HI1172	6-Bit 20 MSPS Video A/D Converter (CMOS)	4102
HI1177	8-Bit 40 MSPS YC 2-Channel D/A Converter	4114
HI1178	8-Bit 40 MSPS RGB 3-Channel D/A Converter	4115
HI20203	8-Bit, 160 MSPS Ultra High-Speed D/A Converters	4096
HI2300	8-Bit 18 MSPS Video A/D Converter with 3.3V Power Supply Operation Function	4103
HI2302	8-Bit 50 MSPS Video A/D Converter with Clamp Function	4105
HI2315	10-Bit 80 MSPS 1-Channel D/A Converter (Ultra-Low Glitch Version)	4119
HI3026	8-Bit 120 MSPS Flash A/D Converter	4109
HI3026A	8-Bit 140 MSPS Flash A/D Converter	4246
HI3086	6-Bit 140 MSPS Flash A/D Converter	4110
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HI3338	CMOS 8-Bit R2R D/A Converter	4134
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HI5728	Dual 10-Bit 125MHz D/A Converter	4321
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HI5735	12-Bit, High Speed Video D/A Converter	4133
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HGTD3N60B3, HGTD3N60B3S, HGT1S3N60B3, HGT1S3N60B3S, HGTP3N60B3	7A, 600V, UFS Series N-Channel IGBTs	TBD
HGTD7N60B3, HGTD7N60B3S, HGT1S7N60B3, HGT1S7N60B3S, HGTP7N60B3	14A, 600V, UFS Series N-Channel IGBTs	4412
HGTP7N60B3D, HGTPS7N60B3D, HGT1SN60B3DS	14A, 600V, UFS Series N-Channel IGBTs with Anti-Parallel Hyperfast Diode	4413
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HGTG12N60B3D, HGTP12N60B3D, HGT1S12N60B3D, HGT1S12N60B3DS	27A, 600V, UFS Series N-Channel IGBTs with Anti-Parallel Hyperfast Diode	4411
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HGTG30N60B3	60A, 600V, UFS Series N-Channel IGBT	4444
HGTG30N60B3D	60A, 600V, UFS Series N-Channel IGBT with Anti-Parallel Hyperfast Diode	4446
HGTD3N60C3, HGTD3N60C3S	6A, 600V, UFS Series N-Channel IGBT	4139

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HGTP3N60C3D, HGT1S3N60C3D, HGT1S3N60C3DS	6A, 600V, UFS Series N-Channel IGBT with Anti-Parallel Hyperfast Diode	4140
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HGTP12N60C3D, HGT1S12N60C3D, HGT1S12N60C3DS	24A, 600V, UFS Series N-Channel IGBT with Anti-Parallel Hyperfast Diode	4261
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HGTP12N60C3DR, HGT1S12N60C3DR, HGT1S12N60CRDRS, HGTG12N60C3DR	24A, 600V, Rugged UFS Series N-Channel IGBT with Anti-Parallel Ultrafast Diode	TBD
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RFP8P06LE	60V, 8A, 0.300 Ohm, P-Channel, Logic Level	4273
RFP42N03L, RF1S42N03L, RF1S42N03LSM	42A, 30V, 0.025 Ohm, N-Channel Logic Level Power MOSFETs	4302
RFP45N02L, RF1S45N02L, RF1S45N02LSM	45A, 20V, 0.022 Ohm, N-Channel Logic Level Power MOSFETs	4342
HUF75307P3, HUF75307D3, HUF75307D3S	13A, 55V, 0.090 Ohm, N-Channel UltraFET™ Power MOSFET	4353
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New Products from Harris Semiconductor

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HFA1109	450MHz, Low Power, Current Feedback Video Operational Amplifier	4019
HFA1149	450MHz, Low Power, Video Operational Amplifier with Programmable Output Disable	4304
HFA1412	Quad, 350MHz, Low Power, Programmable Gain Buffer Amplifier	4152
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New Products from Harris Semiconductor

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HARRIS SEMICONDUCTOR

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FSYA250D,FSYA250R	Radiation Hardened, SEGR Resistant N-Channel Power MOSFETs	4313
FSYA254	Rad Hard, SEGR NMOS, 250V, 18A, 0.170Ω SMD-1	TBD
FSYA450	Rad Hard, SEGR NMOS, 500V, 9A, 0.600Ω SMD-1	TBD
FSYC055	Rad Hard, SEGR NMOS, 60V, 70A, 0.012Ω SMD-2	TBD
FSYC160	Rad Hard, SEGR NMOS, 100V, 66A, 0.022Ω SMD-2	TBD
FSYC260	Rad Hard, SEGR NMOS, 200V, 40A, 0.050Ω SMD-2	TBD
FSYC264	Rad Hard, SEGR NMOS, 250V, 32A, 0.080Ω SMD-2	TBD
FSYA9150	Rad Hard, SEGR PMOS, 100V, 22A, 0.140Ω SMD-1	TBD
FSYA9250	Rad Hard, SEGR PMOS, 200V, 15A, 0.290Ω SMD-1	TBD
FSYC9055	Rad Hard, SEGR PMOS, 60V, 51A, 0.030Ω SMD-2	TBD
FSYC9160	Rad Hard, SEGR PMOS, 100V, 42A, 0.055Ω SMD-2	TBD
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JANSR2N7398	Formerly Available As FSL430R4 Radiation Hardened, SEGR Resistant, N-Channel Power MOSFETs	4372
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JANSR2N7405	Formerly Available As FSF150R4 Radiation Hardened, SEGR Resistant, N-Channel Power MOSFETs	4375
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HFA3724	400MHz Quadrature IF Modulator/Demodulator	4067
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Check our world wide web site for the most current documentation.

GENERAL INFORMATION 2

PRODUCT SELECTION GUIDE

This alpha numeric product index contains all of Harris Semiconductor's base part numbers.

Column 1. Base Part Number

This column contains the base part number for Harris products in alpha numeric order.

Column 2. PSG Page Number

Column 2 allows you to easily locate the pages in this Product Selection Guide which contain additional data on each Harris product.

Column 3. Document

This column displays the actual data sheet file number. This is the document number used to order a data sheet through Answer-FAX (407 724-7800). To receive a data sheet by mail call 1-800-4Harris and request this file number. Many data sheets and app-notes are available on the Harris web site, http://www.semi.harris.com. To find product information search based upon part number or description.

Check our world wide web site for the most current documentation.

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Linear Ordering Nomenclature

HX, HXX "NEW" TYPES

H A 4314B C B 96

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
FA: Ultra-High Frequency Analog
I: Data Acquisition
IN: Interface
V: Analog High Voltage

PART NUMBER

TEMPERATURE
C: 0°C to 70°C
I: -40°C to 85°C
M: -55°C to 125°C

PACKAGE DESIGNATOR
A: Shrink Small Outline Plastic (SSOP)
B: Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
H: Plastic Small Outline Transistor (SOT)
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
L: Ceramic Leadless Chip Carrier (CLCC)
M: Plastic Leaded Chip Carrier (PLCC)
N: Thin Quad Flatpack (TQFP), or Metric Quad Flatpack (MQFP)
Q: Metric Plastic Quad Flatpack (MQFP), or Plastic Quad Flatpack (PQFP)
P: Dual-In-Line Plastic (PDIP)
T: Can
Y: Chip (Commercial Visual)
W: Wafer

SUFFIX
/883: Fully Compliant to MIL-STD-883 Class B/QML
96: Tape and Reel
-T: Tape and Reel

HX "OLD" TYPES

H A 1 - 5134 -2

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
D: Digital
I: Interface
M: Memory
V: Analog High Voltage

PACKAGE DESIGNATOR
1: Ceramic Dual-In-Line Frit-Seal (CERDIP)
1B: Ceramic Dual-In-Line Metal-Seal (SBDIP)
2: Can
3: Dual-In-Line Plastic (PDIP)
4: Ceramic Leadless Chip Carriers (CLCC)
4P: Plastic Leaded Chip Carrier (PLCC)
6: Narrow Dual-In-Line Plastic (PDIP) or Ceramic Dual-In-Line Frit-Seal (CERDIP)
7: 8 Lead Ceramic Dual-In-Line Frit-Seal (CERDIP)
9P: Small Outline Plastic (SOIC)
0: Chip

NOTE: If the package designator is 2 characters the hyphen is omitted from the part number.

PART NUMBER

PERFORMANCE GRADE
A, B: High Performance
C: Relaxed Specification
S: Very High Speed

NOTE: Applies to HA, HD and HM products only.

SUFFIX
96: Tape and Reel Option for SOIC, PLCC
X96: Tape and Reel Option for SOIC, PLCC

TEMPERATURE GRADE
-2: -55°C to 125°C
-4: -25°C to 85°C
-5: 0°C to 75°C
-6: 25°C Chip Probe
-7: Dash-7 High Reliability Commercial Product 0°C to 75°C, includes 96 hour Burn-In
-8: -55°C to 125°C Harris Class B Equivalent Devices for use in Military and Flight Systems
-9: -40°C to 85°C
/883: Fully Compliant to MIL-STD-883, Class B/QML
BXXXX: Customer Specific Screening
RXXXX: Customer Specific Screening
SXXXX: Customer Specific Screening

CA TYPES

CA3260 A T 3

PART NUMBER
CAXXXX

ELECTRICAL OPTIONS
A, B, C, Blank

PACKAGE DESIGNATOR
- D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
- E: Dual-In-Line Plastic (PDIP)
- F: Ceramic Dual-In-Line Frit-Seal(CERDIP)
- J: Ceramic Leadless Chip Carrier (CLCC)
- M: Small Outline Plastic (SOIC)
- Q: Plastic Leaded Chip Carrier (PLCC)
- S: DIL Formed TO-5
- T: Can
- Z: Single-In-Line Plastic (SIP)
- Blank: Refer to Data Sheet for Package Type

SUFFIX
- 3: -55°C to 125°C Modified Class B
- 3W: Modified Class B without High & Low Temperature DC
- 96: Tape and Reel

NOTE: If the part number contains three digits, add a leading zero when ordering. Example: CA555 becomes CA0555.

ICL, ICM TYPES

ICL 8069D C B A T

DEVICE FAMILY
ICL
ICM

PART NUMBER

TEMPERATURE RANGE
- C: Commercial, 0°C to 70°C
- I: Industrial, -25°C to 85°C or -40°C to 85°C (Specified on Data Sheet)
- M: Military, -55°C to 125°C

PACKAGE DESIGNATOR
- B: Small Outline Plastic (SOIC)
- D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
- F: Ceramic Flatpack
- J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
- M: Metric Plastic Quad Flatpack (MQFP)
- P: Plastic Dual-In-Line
- S: TO-52 Can
- T: Can (TO-99, TO-100)
- Z: TO-92 (Plastic)
- /W: Wafer
- /D: Chip

SUFFIX
- /883B: Fully Compliant to MIL-STD-883 Class B/QML
- T: Tape and Reel

PIN COUNT DESIGNATOR

SUFFIX	PIN COUNT	DIAMETER
A	8	
B	10	
C	12	
D	14	
E	16	
F	22	
G	24	
H	42	
I	28	
J	32	
K	35	
L	40	
N	18	
P	20	
Q	2	
R	3	
V	8	0.200″ pin circle, isolated case
W	10	0.230″ pin circle, isolated case
X	10	0.230″ pin circle, case to pin 5
Y	8	0.200″ pin circle, case to pin 4
Z	8	0.230″ pin circle, case to pin 5
44	44	

LM TYPES

LM3302 **M** **96**

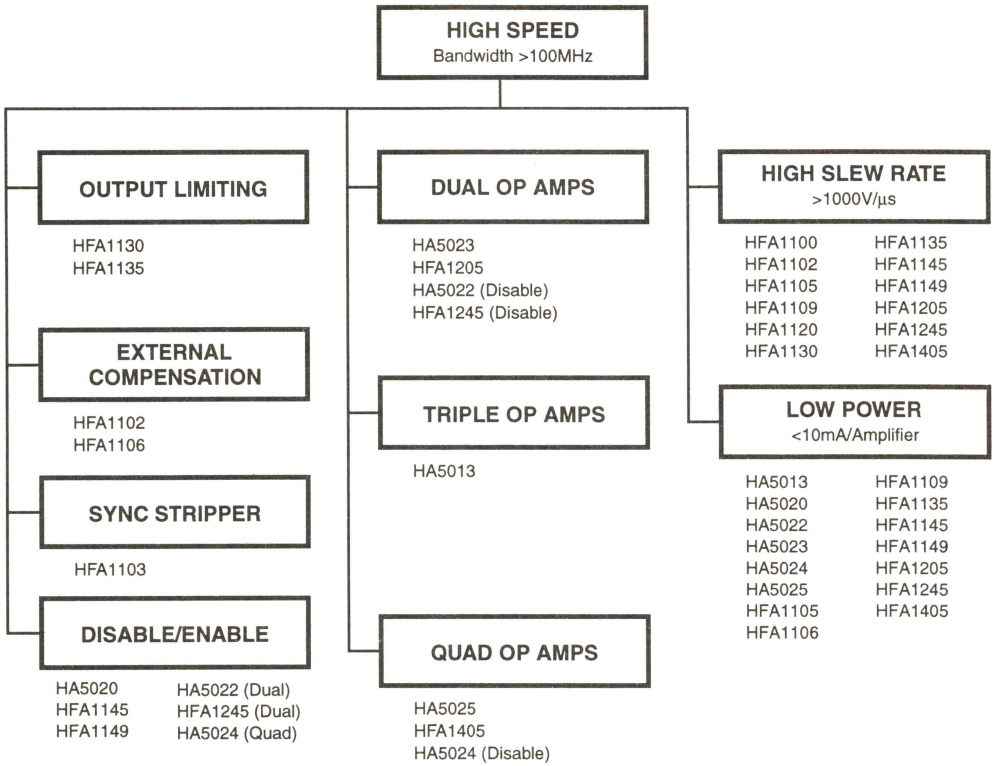
PART NUMBER

PACKAGE DESIGNATOR
M: Small Outline Plastic (SOIC)
H: Can
N: Dual-In-Line Plastic (PDIP)

SUFFIX
96: Tape and Reel

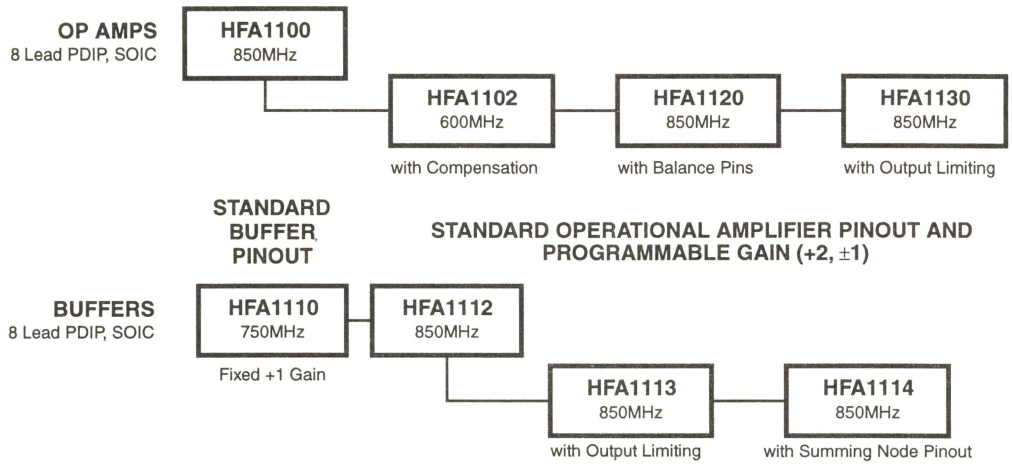
Linear Selection Trees for New Products

OPERATIONAL AMPLIFIERS

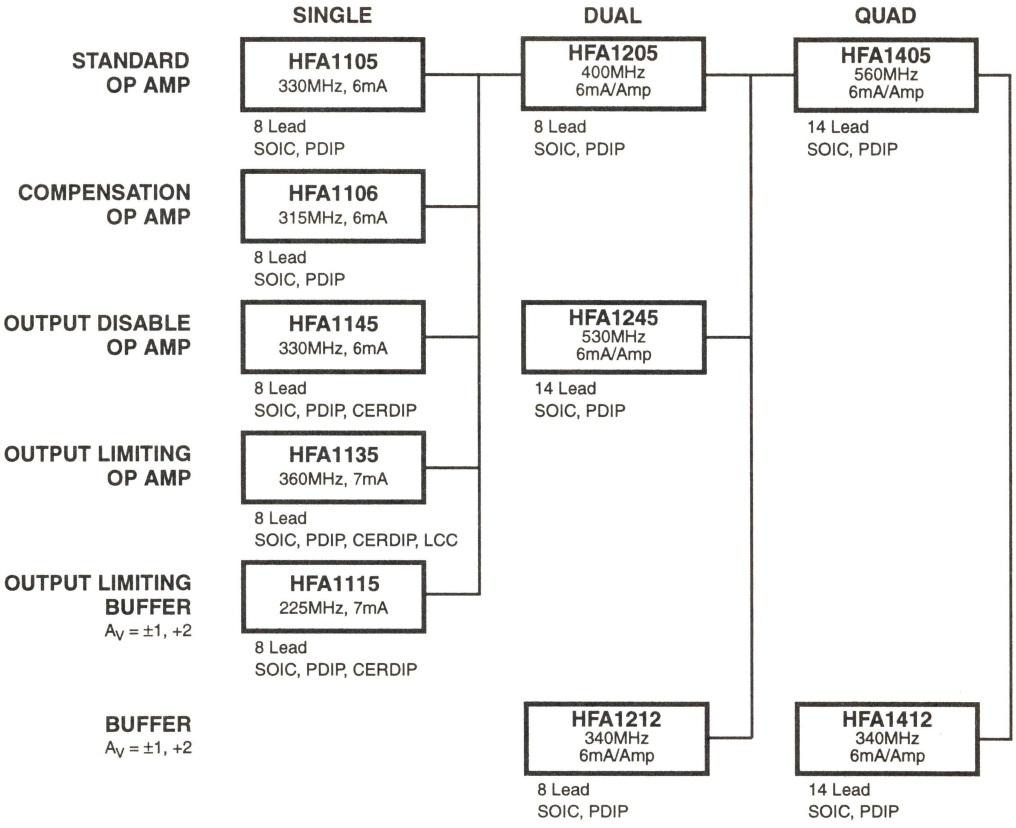


HFA1100 SERIES OP AMPS AND BUFFERS

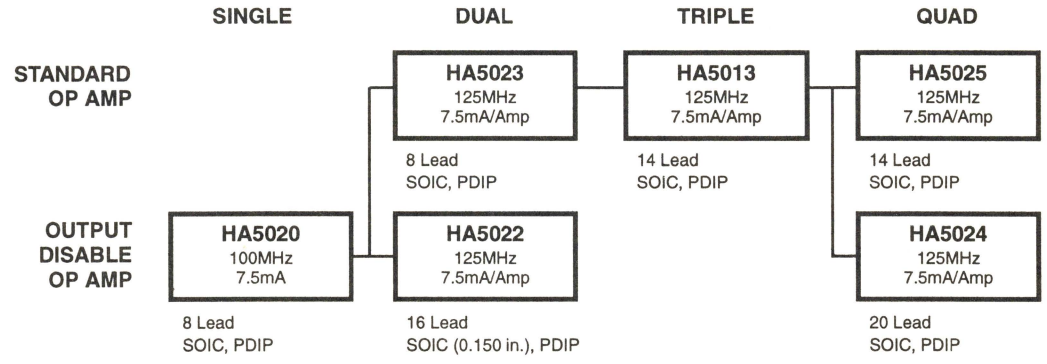
STANDARD OPERATIONAL AMPLIFIER PINOUT



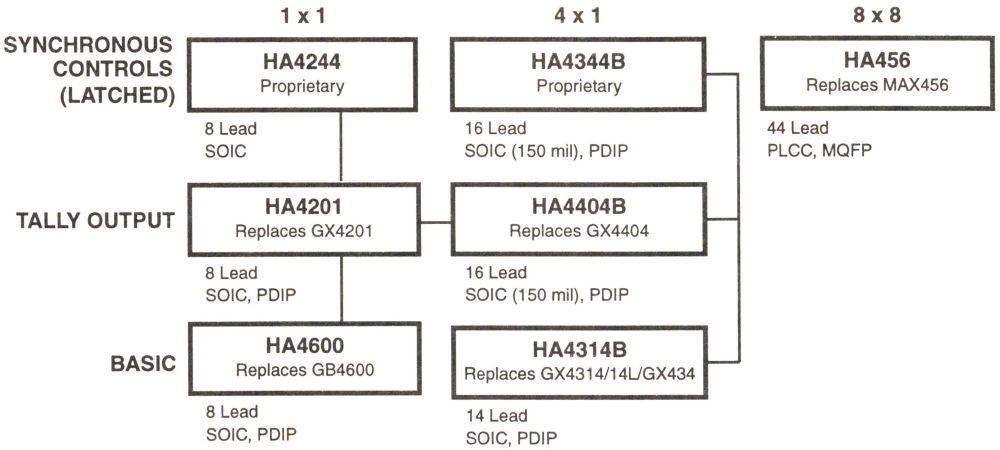
360MHz HFA1105 SERIES OP AMPS AND BUFFERS



HA5020 SERIES VIDEO OPERATIONAL AMPLIFIERS

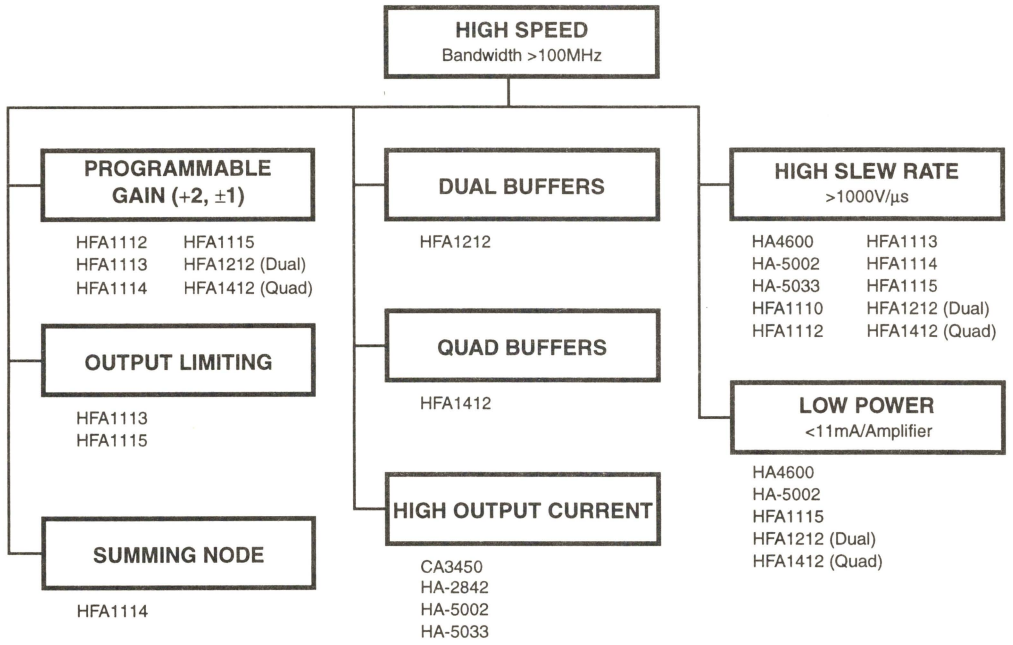


LOW POWER VIDEO CROSSPOINT SWITCHES



See the "High Speed Video Products" Selection Guide for specifications

VIDEO BUFFERS

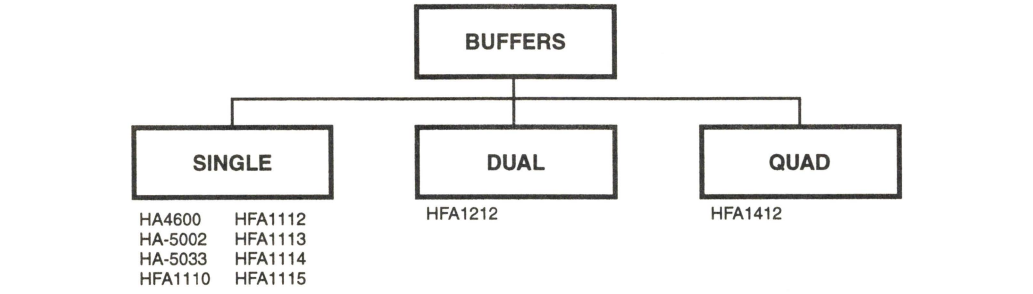


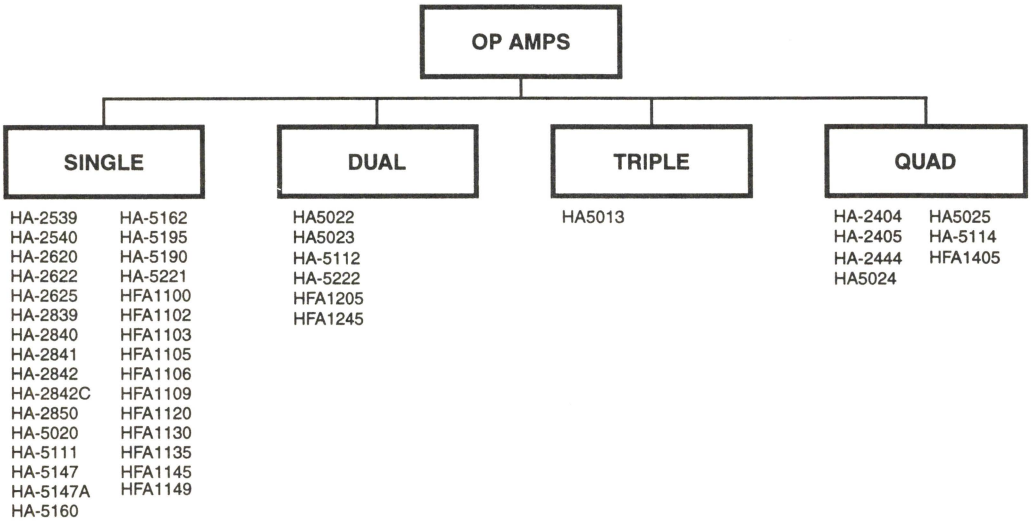
Linear Evaluation Boards

PART #	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	DOC. #
HA-2544	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HA-2840	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HA-2841	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HA-2842	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HA-2850	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HA-5002	HFA1110EVAL	High Speed Buffer (A_V = 1), DIP, Evaluation Board	-
HA5013	HA5025EVAL	Triple and Quad Op Amp and Prog Gain Buffer, 14 Lead DIP, Evaluation Board	-
HA-5020	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HA5022	HA5022EVAL	Dual Op Amp w/ Output Disable, DIP, Evaluation Board	-
HA5023	HA5023EVAL	Dual Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	-
HA5024	HA5024EVAL	HA5024 Op Amp, 20 Lead DIP, Evaluation Board	-
HA5025	HA5025EVAL	Triple and Quad Op Amp and Prog Gain Buffer, 14 Lead DIP, Evaluation Board	-
HA-5033	HFA1110EVAL	High Speed Buffer (A_V = 1), DIP, Evaluation Board	-
HFA1100	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1102	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1103	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1105	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1106	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1109	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1110	HFA1110EVAL	High Speed Buffer (A_V = 1), DIP, Evaluation Board	-
HFA1112	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1113	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1114	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1115	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1120	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1130	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1135	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1145	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1149	HFA11XXEVAL	High Speed Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	AN9202
HFA1205	HA5023EVAL	Dual Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	-
HFA1212	HA5023EVAL	Dual Op Amp and Prog Gain Buffer, 8 Lead DIP, Evaluation Board	-
HFA1245	HA5022EVAL	Dual Op Amp w/ Output Disable, DIP, Evaluation Board	-
HFA1405	HA5025EVAL	Triple and Quad Op Amp and Prog Gain Buffer, 14 Lead DIP, Evaluation Board	-
HFA1412	HA5025EVAL	Triple and Quad Op Amp and Prog Gain Buffer, 14 Lead DIP, Evaluation Board	-
HFA3424	HFA3424EVAL	PRISM, HFA3424, 2.4GHz - 2.5GHz Low Noise Amplifier Evaluation Board	AN9627
HFA3524	HFA3524EVAL	PRISM, HFA3524, Dual Synthesizer Evaluation Board	AN9630
HFA3600	HFA3600EVAL	HFA3600 LNA/Mixer Evaluation Board	FN3655
HFA3624	HFA3624EVAL	PRISM, HFA3624, RF to IF Converter Evaluation Board	AN9618
HFA3724	HFA3724EVAL	PRISM, HFA3724, Modulator/Demodulator Evaluation Board	AN9622
HFA3925	HFA3925EVAL	PRISM, HFA3925, 2.4GHz - 2.5GHz Power Amplifier Evaluation Board	AN9638

Linear Selection Guide

WIDEBAND OPERATIONAL AMPLIFIERS AND BUFFERS





WIDEBAND: Min/Max Limits at 25°C, Unless Otherwise Specified

DEVICE	GBWP (TYP) (MHz)	FPBW (TYP) (MHz)	SLEW RATE (TYP) (V/μs)	A_{VOL} (dB)/ A_{ZOL} (V/mA)	MINIMUM STABLE GAIN	OFFSET VOLTAGE (mV)	BIAS CURRENT (nA)	CMRR (dB)	PSRR (dB)	SUPPLY CURRENT (mA/OP AMP)
BUFFERS										
HFA1112	850	260	2400	-	+1, -1, +2	25	35000	-	39	26.0
HFA1113	850	260	2400	-	+1, -1, +2	25	35000	-	39	26.0
HFA1114	850	260	2400	-	+1, -1, +2	25	35000	-	39	26.0
HFA1110	750	150	1300	-	+1	25	40000	-	39	26.0
HA4600	400	-	1700	-	+1	10	50000	-	-	13.0
HA-5033	250	17.5	1100	-	+1	15	35000	-	54	25.0
HFA1115	225	140	1100	-	+1, -1, +2	10	15000	-	45	7.1
HA-5002	110	20.7	1300	-	+1	20	7000	-	54	10.0

NOTE: Bold type designates a new product from Harris.

WIDEBAND: Min/Max Limits at 25°C, Unless Otherwise Specified **(Continued)**

DEVICE	GBWP (TYP) (MHz)	FPBW (TYP) (MHz)	SLEW RATE (TYP) (V/μs)	A_{VOL} (dB)/ A_{ZOL} (V/mA)	MINIMUM STABLE GAIN	OFFSET VOLTAGE (mV)	BIAS CURRENT (nA)	CMRR (dB)	PSRR (dB)	SUPPLY CURRENT (mA/OP AMP)
DUAL BUFFERS										
HFA1212	340	140	1100	-	+1, -1, +2	10	15000	-	45	6.1
QUAD BUFFERS										
HFA1412	225	140	1100	-	+1, -1, +2	10	15000	-	45	6.1
SINGLE OP AMPS										
HFA1100	850	300	2300	500 (Note 1)	1	6.0	40000	40	45	26.0
HFA1120	850	300	2300	500 (Note 1)	1	6.0	40000	40	45	26.0
HFA1130	850	300	2300	500 (Note 1)	1	6.0	40000	40	45	26.0
HA-2539	600	9.5	600	80	10	10.0	20000	60	60	25.0
HA-2839	600	10.0	625	86	10	2.0	14500	75	75	15.0
HA-2840	600	10.0	625	86	10	2.0	14500	75	75	15.0
HA-2850	470	5.4	340	86	10	2.0	14500	75	75	8.0
HFA1109	**450**	**TBD**	**1100**	**500** (Note 1)	**1**	**5.0**	**10000**	**47**	**50**	**10.0**
HFA1149	**450**	**TBD**	**1100**	**500** (Note 1)	**1**	**5.0**	**10000**	**47**	**50**	**10.0**
HA-2540	400	6.0	400	80	10	10.0	20000	60	60	25.0
HFA1105	350	140	1000	500 (Note 1)	1	5.0	15000	47	50	6.1
HFA1145	350	140	1000	500 (Note 1)	1	5.0	15000	47	50	6.1
HFA1135	350	170	1200	500 (Note 1)	1	5.0	15000	47	50	7.1
HFA1106	315	100	700	500 (Note 1)	1 (Note 2)	5.0	15000	47	50	6.1
HA-5190	150	6.5	200	83	5	5.0	15000	74	70	28.0
HA-5195	150	6.5	200	83	5	6.0	15000	74	70	28.0
HA-5147	140	0.5	35	117	10	0.1	80	100	86	4.0
HA-5147A	120	0.5	35	120	10	0.03	40	114	108	4.0
HA-5020	100	17.5	1100	3500 (Note 1)	1	8.0	8000	60	64	10.0
HA-2620	100	0.6	35	100	5 (Note 2)	4.0	15	80	80	3.7
HA-2622	100	0.6	35	98	5 (Note 2)	5.0	25	74	74	4.0
HA-2625	100	0.6	35	98	5 (Note 2)	5.0	25	74	74	4.0
HA-5111	100	0.8	50	120	10 (Note 2)	3.0	200	80	80	6.0

NOTE: Bold type designates a new product from Harris.

WIDEBAND: Min/Max Limits at 25°C, Unless Otherwise Specified **(Continued)**

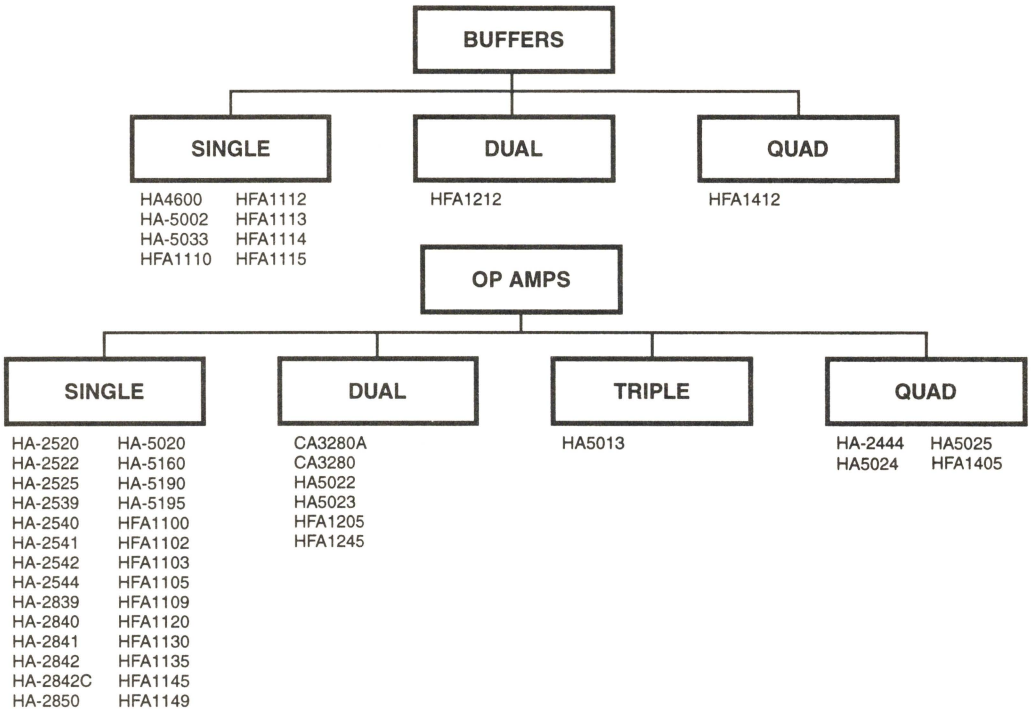
DEVICE	GBWP (TYP) (MHz)	FPBW (TYP) (MHz)	SLEW RATE (TYP) (V/μs)	A_{VOL} (dB)/ A_{ZOL} (V/mA)	MINIMUM STABLE GAIN	OFFSET VOLTAGE (mV)	BIAS CURRENT (nA)	CMRR (dB)	PSRR (dB)	SUPPLY CURRENT (mA/OP AMP)
HA-5160	100	1.9	120	97	10 (Note 2)	3.0	0.05	74	74	10.0
HA-5162	100	1.10	70	88	10 (Note 2)	15.0	0.065	70	70	12.0
HA-5221	100	0.56	35	106	1	0.75	80	86	86	11.0
HA-2842C	150	18.0	1200	94	2 (Note 2)	3.0	10000	80	70	15.0
HA-2842	80	6.0	400	94	2	3.0	10000	80	70	15.0
HA-2841	50	3.8	240	88	1	3.0	10000	80	70	11.0
DUAL OP AMPS										
HFA1245	530	150	1050	500 (Note 1)	1	5	15000	45	48	6.1
HFA1205	400	180	1275	500 (Note 1)	1	5	15000	45	48	6.1
HA5022	125	28	475	1000 (Note 1)	1	3.0	8000	53	60	10.0
HA5023	125	28	475	1000 (Note 1)	1	3.0	8000	53	60	10.0
HA-5222	100.0	0.56	35	106	1	0.75	80.0	86	86	11.0
HA-5112	60.0	0.32	20	100	10	2.0	200.0	86	86	2.5
TRIPLE OP AMPS										
HA5013	125	28	475	3500 (Note 1)	1	3.0	8000	53	60	10.0
QUAD OP AMPS										
HFA1405	400	TBD	1000	500 (Note 1)	1	5	15000	45	48	6.1
HA5024	125	28	475	3500 (Note 1)	1	3.0	8000	53	60	10.0
HA5025	125	28	475	3500 (Note 1)	1	3.0	8000	53	60	10.0
HA-5114	60.0	0.32	20.0	100	10	2.5	200.0	86	86	1.63
HA-2444	50.0	5.1	160	71	1	7.0	15000	70	65	6.25
HA-2400	40.0	0.95	30.0	94	10 (Note 2)	9.0	200.0	80	74	1.5
HA-2404	40.0	0.95	30.0	94	10 (Note 2)	9.0	200.0	80	74	1.5
HA-2405	40.0	0.95	30.0	94	10 (Note 2)	9.0	250.0	74	74	1.5

NOTES:

1. A_{ZOL} applies to current feedback amplifiers only (HA-5004, HA-502X, HFA11XX, HFA12XX, HFA14XX).
2. Product features an external compensation pin to limit bandwidth for noise reduction or to allow unity gain operation.

NOTE: Bold type designates a new product from Harris.

HIGH SLEW RATE OPERATIONAL AMPLIFIERS AND BUFFERS



HIGH SLEW RATE: Min/Max Limits at 25°C, Unless Otherwise Specified

DEVICE	SLEW RATE (TYP) (V/µs)	GBWP (TYP) (MHz)	FPBW (TYP) (MHz)	A_{VOL} (dB)/ A_{ZOL} (V/mA)	MINIMUM STABLE GAIN	OFFSET VOLTAGE (mV)	BIAS CURRENT (nA)	CMRR (dB)	PSRR (dB)	SUPPLY CURRENT (mA/OP AMP)
BUFFERS										
HFA1112	2400	850	260	-	+1, -1, +2	25	35000	-	39	26.0
HFA1113	2400	850	260	-	+1, -1, +2	25	35000	-	39	26.0
HFA1114	2400	850	260	-	+1, -1, +2	25	35000	-	39	26.0
HA4600	1700	400	-	-	+1	10	50000	-	-	13.0
HFA1110	1300	750	150	-	+1	25	40000	-	39	26.0
HA-5002	1300	110	20.7	-	+1	20	7000	-	54	10.0
HFA1115	1100	225	140	-	+1, -1, +2	10	15000	-	45	7.1
HA-5033	1100	250	17.5	-	+1	15	35000	-	54	25.0
DUAL BUFFERS										
HFA1212	1100	340	140	-	+1, -1, +2	10	15000	-	45	6.1
QUAD BUFFERS										
HFA1412	1100	225	140	-	+1, -1, +2	10	15000	-	45	6.1

NOTE: Bold type designates a new product from Harris.

HIGH SLEW RATE: Min/Max Limits at 25°C, Unless Otherwise Specified **(Continued)**

DEVICE	SLEW RATE (TYP) (V/μs)	GBWP (TYP) (MHz)	FPBW (TYP) (MHz)	A_{VOL} (dB)/ A_{ZOL} (V/mA)	MINIMUM STABLE GAIN	OFFSET VOLTAGE (mV)	BIAS CURRENT (nA)	CMRR (dB)	PSRR (dB)	SUPPLY CURRENT (mA/OP AMP)
SINGLE OP AMPS										
HFA1100	2300	850	300	500 (Note 1)	1	6	40000	40	45	26.0
HFA1120	2300	850	300	500 (Note 1)	1	6	40000	40	45	26.0
HFA1130	2300	850	300	500 (Note 1)	1	6	40000	40	45	26.0
HFA1135	1200	350	170	500 (Note 1)	1	5	15000	47	50	7.1
HA-2842C	1200	150	18.0	94	2 (Note 2)	3	10000	80	70	15.0
HFA1109	**1100**	**450**	**TBD**	**500** (Note 1)	**1**	**5**	**10000**	**47**	**50**	**10.0**
HFA1149	**1100**	**450**	**TBD**	**500** (Note 1)	**1**	**5**	**10000**	**47**	**50**	**10.0**
HA-5020	1100	100	17.5	3500 (Note 1)	1	8	8000	60	64	10.0
HFA1105	1000	350	140	500 (Note 1)	1	5	15000	47	50	6.1
HFA1145	1000	350	140	500 (Note 1)	1	5	15000	47	50	6.1
HA-2839	625	600	10.0	86	10	2	14500	75	75	15.0
HA-2840	625	600	10.0	86	10	2	14500	75	75	15.0
HA-2539	600	600	9.5	80	10	10	20000	60	60	25.0
HA-2540	400	400	6.0	80	10	10	20000	60	60	25.0
HA-2842	400	80	6.0	94	2	3	10000	80	70	15.0
HA-2542	350	70	5.5	80	2 (Note 2)	10	35000	70	70	34.5
HA-2850	340	400	5.4	86	10	2	14500	75	75	8.0
HA-2841	240	50	3.8	88	1	3	10000	80	70	11.0
HA-2541	250	40	4.0	80	1	2	35000	70	70	40.0
HA-5190	200	150	6.5	83	5	5	15000	74	70	28.0
HA-5195	200	150	6.5	83	5	6	15000	74	70	28.0
HA-2544	150	50	4.2	71	1	15	15000	75	70	12.0
HA-2520	120	20	2	80	3 (Note 2)	8	200	80	80	6.0
HA-2522	120	20	2	78	3 (Note 2)	10	250	74	74	6.0
HA-2525	120	20	2	78	3 (Note 2)	10	250	74	74	6.0

NOTE: Bold type designates a new product from Harris.

HIGH SLEW RATE: Min/Max Limits at 25°C, Unless Otherwise Specified **(Continued)**

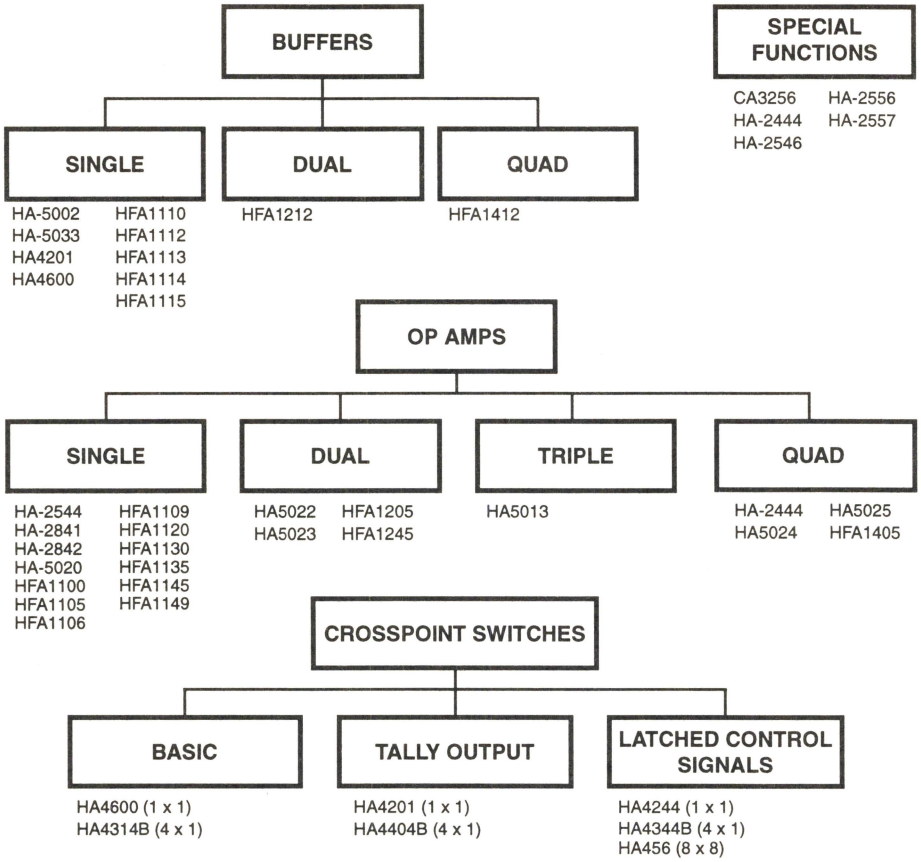
DEVICE	SLEW RATE (TYP) (V/µs)	GBWP (TYP) (MHz)	FPBW (TYP) (MHz)	A_{VOL} (dB)/ A_{ZOL} (V/mA)	MINIMUM STABLE GAIN	OFFSET VOLTAGE (mV)	BIAS CURRENT (nA)	CMRR (dB)	PSRR (dB)	SUPPLY CURRENT (mA/OP AMP)
HA-5160	120	100	1.9	97	10 (Note 2)	3	0.05	74	74	10.0
DUAL OP AMPS										
HFA1205	1275	400	140	500 (Note 1)	1	5	15000	45	48	6.1
HFA1245	1050	530	130	500 (Note 1)	1	5	15000	45	48	6.1
HA5022	475	125	28	1000 (Note 1)	1	3	8000	53	60	10.0
HA5023	475	125	28	1000 (Note 1)	1	3	8000	53	60	10.0
CA3280	125	9.0	1.99	94	1	3	5000	80	86	2.4
CA3280A	125	9.0	1.99	94	1	0.5	5000	94	94	2.4
TRIPLE OP AMPS										
HA5013	475	125	28	3500 (Note 1)	1	3	8000	53	60	10.0
QUAD OP AMPS										
HFA1405	1000	400	TBD	500 (Note 1)	1	5	15000	45	48	6.1
HA5024	475	125	28	3500 (Note 1)	1	3	8000	53	60	10.0
HA5025	475	125	28	3500 (Note 1)	1	3	8000	53	60	10.0
HA-2444	160	50	5.1	71	1	7	15000	70	65	6.25

NOTES:

1. A_{ZOL} applies to current feedback amplifiers only (HA-5004, HA-502X, HFA11XX, HFA12XX, HFA14XX).
2. Product features an external compensation pin to limit bandwidth for noise reduction or to allow unity gain operation.

NOTE: Bold type designates a new product from Harris.

HIGH SPEED VIDEO PRODUCTS



VIDEO: Typical Values at 25°C, Unless Otherwise Specified

DEVICE	FEATURES	DIF. GAIN (%)	DIF. PHASE (DEG)	0.1dB FLAT GAIN (MHz)	GBWP (MHz)	SLEW RATE (V/µs)	OUTPUT CURRENT (mA)	SUPPLY VOLTAGE RANGE (±V)	SUPPLY CURRENT (mA/OP AMP)
BUFFERS									
HA4600	**Video Buffer w/Output Disable**	**0.01**	**0.01**	**250**	**480**	**1700**	**20**	**4.5 - 5.5**	**10.5**
HFA1110	+1, Std. Buffer Pinout	0.02	0.02	>100	750	1300	60	4.5 - 5.5	21.0
HFA1112	-1, +1, +2 (Selectable) Standard Op Amp Pinout	0.02	0.04	>100	850	2400	60	4.5 - 5.5	21.0
HFA1113	-1, +1, +2 (Selectable) Standard Op Amp Pinout, V_{OUT} Limits	0.02	0.04	>100	850	2400	60	4.5 - 5.5	21.0
HFA1114	-1, +1, +2 (Selectable) Summing Node Pinout	0.02	0.04	>100	850	1100	60	4.5 - 5.5	21.0

NOTE: Bold type designates a new product from Harris.

VIDEO: Typical Values at 25°C, Unless Otherwise Specified **(Continued)**

DEVICE	FEATURES	DIF. GAIN (%)	DIF. PHASE (DEG)	0.1dB FLAT GAIN (MHz)	GBWP (MHz)	SLEW RATE (V/μs)	OUTPUT CURRENT (mA)	SUPPLY VOLTAGE RANGE (±V)	SUPPLY CURRENT (mA/OP AMP)
HFA1115	-1, +1, +2 (Selectable) Standard Op Amp Pinout, V_{OUT} Limits	0.02	0.03	>50	225	1100	60	4.5 - 5.5	5.9
HA-5033	+1, Std. Buffer Pinout	0.03	0.02	-	250	1100	100	5 - 16	21.0
HA-5002	+1, Std. Buffer Pinout	0.06	0.21	-	110	1300	200	5 - 20	8.3
DUAL BUFFERS									
HFA1212	-1, +1, +2 (Selectable)	0.02	0.02	>50	340	1100	60	4.5 - 5.5	5.9
QUAD BUFFERS									
HFA1412	-1, +1, +2 (Selectable)	0.02	0.02	>50	225	1100	60	4.5 - 5.5	5.9
SINGLE OP AMPS									
HFA1109	**$A_V \geq 1$, CFB, Wideband**	**0.02**	**0.02**	**100**	**450**	**1100**	**36**	**4.5 - 5.5**	**10.0**
HFA1149	**$A_V \geq 1$, CFB, Programmable Output Disable**	**0.02**	**0.02**	**100**	**450**	**1100**	**36**	**4.5 - 5.5**	**10.0**
HFA1105	$A_V \geq 1$, Low I_{CC}, CFB	0.02	0.03	>50	350	1000	60	4.5 - 5.5	5.9
HFA1145	$A_V \geq 1$, Low I_{CC}, CFB, Output Disable	0.02	0.03	>50	350	1000	60	4.5 - 5.5	5.9
HFA1135	$A_V \geq 1$, Low I_{CC}, CFB, Programmable Output Limiting	0.02	0.04	>50	360	1200	60	4.5 - 5.5	6.9
HFA1106	HFA1105 with Compensation Pin for Bandwidth Limiting	0.02	0.05	100	315	700	60	4.5 - 5.5	5.9
HA-2842	$A_V \geq 2$, Cable Driver	0.02	0.03	>10	80	400	100	6 - 17	14.2
HA-5020	$A_V \geq 1$, Output Disable, CFB (Current Feedback)	0.02	0.03	5	100	1100	32	4.5 - 18	7.5
HFA1100	$A_V \geq 1$, CFB	0.03	0.05	75	850	2300	60	4.5 - 5.5	21.0
HFA1120	HFA1100 with Offset Adjust	0.03	0.05	75	850	2300	60	4.5 - 5.5	21.0
HFA1130	$A_V \geq 1$, CFB, Programmable Output Limiting	0.03	0.05	75	850	2300	60	4.5 - 5-5	21.0
HA-2544	$A_V \geq 1$	0.03	0.03	5	50	150	35	8 - 17	10.0
HA-2841	$A_V \geq 1$, Low I_{CC}	0.03	0.03	>10	50	240	30	6 - 17	10.0
DUAL OP AMPS									
HFA1245	$A_V \geq 1$, Low I_{CC}, CFB, Output Disable	0.02	0.03	50	530	1050	60	4.5 - 5.5	5.9
HFA1205	$A_V \geq 1$, Low I_{CC}, CFB	0.03	0.03	>50	400	1275	60	4.5 - 5.5	5.9
HA5022	$A_V \geq 1$, CFB, Output Disable	0.03	0.03	20	125	475	20	4.5 - 18	7.5
HA5023	$A_V \geq 1$, CFB	0.03	0.03	20	125	475	20	4.5 - 18	7.5

NOTE: Bold type designates a new product from Harris.

VIDEO: Typical Values at 25°C, Unless Otherwise Specified **(Continued)**

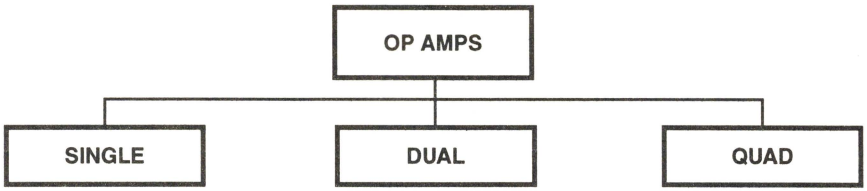
DEVICE	FEATURES	DIF. GAIN (%)	DIF. PHASE (DEG)	0.1dB FLAT GAIN (MHz)	GBWP (MHz)	SLEW RATE (V/µs)	OUTPUT CURRENT (mA)	SUPPLY VOLTAGE RANGE (±V)	SUPPLY CURRENT (mA/OP AMP)
TRIPLE OP AMPS									
HA5013	$A_V \geq 1$, CFB	0.03	0.03	20	125	475	20	4.5 - 18	7.5
QUAD OP AMPS									
HFA1405	$A_V \geq 1$, Low I_{CC}, CFB	0.03	0.03	TBD	400	>1000	60	4.5 - 5.5	5.9
HA5024	$A_V \geq 1$, CFB, Output Disable	0.03	0.03	20	125	475	20	4.5 - 18	7.5
HA5025	$A_V \geq 1$, CFB	0.03	0.03	20	125	475	20	4.5 - 18	7.5
HA-2444	$A_V \geq 1$, 4-Channel, Mux'd Output	0.03	0.03	10	50	160	25	8.5 - 17	5.0
CROSSPOINT SWITCHES									
HA4600	**1 x 1**	**0.01**	**0.01**	**250**	**480**	**1700**	**85** (Note 2)	**4.5 - 5.5**	**10.5**
HA4201	**1 x 1 with Tally Output**	**0.01**	**0.01**	**250**	**480**	**1700**	**85** (Note 2)	**4.5 - 5.5**	**10.5**
HA4244	**1 x 1 with Latched Control Signal**	**0.01**	**0.01**	**250**	**480**	**1700**	**85** (Note 2)	**4.5 - 5.5**	**10.5**
HA4314B	**4 x 1**	**0.01**	**0.01**	**100**	**400**	**1400**	**-90** (Note 3)	**4.5 - 5.5**	**10.5**
HA4404B	**4 x 1 with Tally Outputs**	**0.01**	**0.01**	**165**	**330**	**1250**	**-90** (Note 3)	**4.5 - 5.5**	**10.5**
HA4344B	**4 x 1 with Latched Control Signals**	**0.01**	**0.01**	**150**	**350**	**1400**	**-90** (Note 3)	**4.5 - 5.5**	**10.5**
HA456	**Low Power 8 x 8, A_V = +1**	**0.05**	**0.05**	**40**	**120**	**200**	**-55** (Note 3)	**4.5 - 5.5**	**68**
SPECIAL FUNCTION									
HA-2546	Multiplier, 2 Quad, Voltage Output	<0.1	<0.1	5	30	300	45	7 - 17	23.0
HA-2556	Multiplier, 4 Quadrant, Voltage Output	<0.1	<0.1	10	65	420	45	5 - 17	18.0
HA-2557	Multiplier, 4 Quadrant, Current Output	-	-	-	100	t_r = 5ns	1.6	5 - 17	13.0
HA-2444	$A_V \geq 1$, 4-Channel, Mux'd Output	0.03	0.03	10	50	160	25	8.5 - 17	20.0
CA3256	Video Switch and Amplifier	1.0	1.0	-	25	200	16	4 - 18 (Note 1)	20.0

NOTES:

1. Single Supply Range.
2. Off Isolation in dB at 100MHz.
3. All Hostile Crosstalk in dB at 10MHz.

NOTE: Bold type designates a new product from Harris.

LOW NOISE OPERATIONAL AMPLIFIERS



SINGLE		DUAL		QUAD	
HA-2539	HA-5137A	HA5022	HA-5222	HA5024	HA-5114
HA-2540	HA-5147A	HA5023	HFA1205	HA5025	HA-5134
HA-2541	HA-5170	HA-5102	HFA1245	HA-5104	HFA1405
HA-2542	HA-5190	HA-5112			
HA-2839	HA-5221				
HA-2840	HFA1105				
HA-5020	HFA1106				
HA-5101	HFA1109				
HA-5111	HFA1135				
HA-5127A	HFA1145				
	HFA1149				

LOW NOISE: Min/Max Limits at 25°C, Unless Otherwise Specified

DEVICE	NOISE VOLTAGE 1kHz (TYP) (nV/√Hz)	NOISE CURRENT 1kHz (TYP) (pA/√Hz)	GBWP (TYP) (MHz)	SLEW RATE (TYP) (V/μs)	MINIMUM STABLE GAIN	OFFSET VOLTAGE (mV)	BIAS CURRENT (nA)	SUPPLY CURRENT (mA/OP AMP)
SINGLE OP AMPS								
HA-5127A	3.0	0.4	8.5	10	1	0.025	40	4.0
HA-5137A	3.0	0.4	63	20	5	0.025	40	4.0
HA-5147A	3.0	0.4	120	35	10	0.025	40	4.0
HA-5101	3.0	0.6	10	10	1	3.0	200	6.0
HA-5111	3.0	0.6	100	50	10	3.0	200	6.0
HA-5221	3.4	0.97	100	35	1	0.75	80	11.0
HFA1105	3.5	2.5 (Note 1)	350	1000	1	5.0	15000	6.1
HFA1106	3.5	2.5 (Note 1)	315	700	1 (Note 2)	5.0	15000	6.1
HFA1135	3.5	2.5 (Note 1)	350	1200	1	5.0	15000	7.1
HFA1145	3.5	2.5 (Note 1)	350	1000	1	5.0	15000	6.1
HFA1109	**4.0**	**2.4** (Note 1)	**450**	**1100**	**1**	**5.0**	**10000**	**10.0**
HFA1149	**4.0**	**2.4** (Note 1)	**450**	**1100**	**1**	**5.0**	**10000**	**10.0**
HA-5020	4.5	2.5 (Note 1)	100	1100	1	8.0	8000 (Note 1)	10.0
HA-5190	6.0	5.0	150	200	5	5.0	15000	28.0

NOTE: Bold type designates a new product from Harris.

LOW NOISE: Min/Max Limits at 25°C, Unless Otherwise Specified **(Continued)**

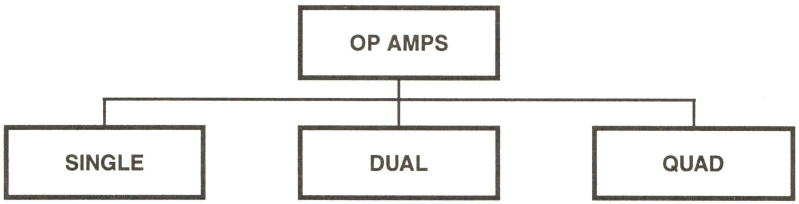
DEVICE	NOISE VOLTAGE 1kHz (TYP) (nV/√Hz)	NOISE CURRENT 1kHz (TYP) (pA/√Hz)	GBWP (TYP) (MHz)	SLEW RATE (TYP) (V/µs)	MINIMUM STABLE GAIN	OFFSET VOLTAGE (mV)	BIAS CURRENT (nA)	SUPPLY CURRENT (mA/OP AMP)
HA-2839	6.0	6.0	600	625	10	2.0	14500	15.0
HA-2840	6.0	6.0	600	625	10	2.0	14500	15.0
HA-2539	6.0	6.0	600	600	10	10.0	20000	25.0
HA-2540	6.0	6.0	400	400	10	10.0	20000	25.0
HA-5170	10.0	0.01	8.0	8.0	1	0.3	0.1	2.5
HA-2542	10.0	3.0	70	350	2 (Note 2)	10.0	35000	34.5
HA-2541	10.0	4.0	40	250	1	2.0	35000	40.0
DUAL OP AMPS								
HA-5222	3.4	0.97	100	35	1	0.75	80	11.0
HFA1205	3.5	2.5 (Note 1)	400	1275	1	5.0	15000	6.1
HFA1245	3.5	2.5 (Note 1)	530	1050	1	5.0	15000	6.1
HA-5102	4.3	0.57	8.0	3.0	1	2.0	200	2.5
HA-5112	4.3	0.57	60	20	10	2.0	200	2.5
HA5022	4.5	2.5 (Note 1)	125	475	1	3.0	8000 (Note 1)	10.0
HA5023	4.5	2.5 (Note 1)	125	475	1	3.0	8000 (Note 1)	10.0
QUAD OP AMPS								
HFA1405	3.5	2.5 (Note 1)	400	>1000	1	5.0	15000	6.1
HA-5104	4.3	0.57	8.0	3.0	1	2.5	200	1.63
HA-5114	4.3	0.57	60	20	10	2.5	200	1.63
HA5024	4.5	2.5 (Note 1)	125	475	1	3.0	8000 (Note 1)	10.0
HA5025	4.5	2.5 (Note 1)	125	475	1	3.0	8000 (Note 1)	10.0
HA-5134	7.0	1.0	4.0	1.0	1	0.2	50	2.0

NOTES:

1. +Input. These are current feedback amplifiers, so value for -Input will be larger.
2. Product features an external compensation pin to limit bandwidth for additional noise reduction or to allow unity gain operation.

NOTE: Bold type designates a new product from Harris.

GENERAL PURPOSE OPERATIONAL AMPLIFIERS



GENERAL PURPOSE: Typical Values at 25°C, Unless Otherwise Specified

DEVICE	DESCRIPTION	MINIMUM STABLE GAIN	GBWP (MHz)	SLEW RATE (V/μs)	OFFSET VOLTAGE (mV)	BIAS CURRENT (μA)	SUPPLY VOLTAGE RANGE (±V)	SUPPLY CURRENT (mA/OP AMP)
SINGLE OP AMPS								
HA-2544	Ultra-Stable, High Performance	1	50	150	6.0	7.00	8-17.5	10.0
CA3100	Wideband Amplifier	1	38	70	1.0	0.7	7-18	8.5
CA3130A	BiMOS, CMOS Output, Output Strobe	1	15	30	2.0	5.0pA	2.5-8	2.0
HA-2500	Wideband, High Slew Rate, High Input Impedance	1	12	30	2.0	0.1	10-20	4.0
HA-2510	Wideband, High Slew Rate, High Input Impedance	1	12	60	4.0	0.1	10-20	4.0
HA-2600	Wideband, Compensated, High Input Impedance	1	12	7	0.5	0.001	4-22.5	3.0
HA-5101	Low Noise, High Performance	1	10	10	0.5	0.1	3-20	4.0
HA-5127A	Low Noise, Precision, Compensated	1	8.5	10	0.01	0.01	5-22	3.5
HA-5170	JFET Input, Precision	1	8	8	0.1	20pA	5-22	1.9
CA3140A	BiMOS, Output Strobe Capability	1	4.5	9	2.0	10.0pA	2-18	4.0
HA-2640	High Voltage, Compensated	1	4	5	2.0	0.01	10-50	3.2
CA3160A	BiMOS, CMOS Output, Output Strobe	1	4	10	2.0	5.0pA	2.5-8	2.0
CA3080	Operational Transconductance Amp	1	2	75	0.4	2.0	2-18	1.0
CA741	Low Cost, Mil/Com Temp	1	1	0.5	1.0	0.08	5-22	1.7

NOTE: Bold type designates a new product from Harris.

GENERAL PURPOSE: Typical Values at 25°C, Unless Otherwise Specified **(Continued)**

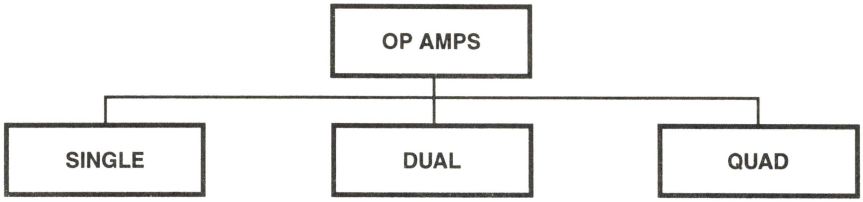
DEVICE	DESCRIPTION	MINIMUM STABLE GAIN	GBWP (MHz)	SLEW RATE (V/μs)	OFFSET VOLTAGE (mV)	BIAS CURRENT (μA)	SUPPLY VOLTAGE RANGE (±V)	SUPPLY CURRENT (mA/OP AMP)
LM741	Low Cost, Mil/Com Temp	1	1	0.5	1.0	0.08	5-22	1.7
HA-2520	Uncompensated	3 (Note 1)	20	120	5.0	0.125	10-20	4.0
HA-5137A	Low Noise, Precision	5	80	20	0.01	0.01	5-22	3.5
HA-2620	Wideband, Uncompensated, High Input Impedance	5 (Note 1)	100	35	0.5	0.001	4-22.5	3.0
HA-5195	Wideband, Fast Settling	5	150	200	3.0	5.0	12-17.5	19.0
HA-5147A	Low Noise, Precision, Wideband	10	140	35	0.01	0.01	5-22	3.5
HA-5111	Low Noise, High Performance, Uncompensated	10 (Note 1)	100	50	0.5	0.1	3-20	4.0
DUAL								
CA3280A	Operational Transconductance Amp	1	9	125	0.25	1.8	2-18	2.0
HA-5102	Low Noise, High Performance	1	8	3	0.5	0.13	3-20	1.5
CA3240A	BiMOS, High Input Impedance	1	4.5	9	2.0	10.0pA	2-18	4.0
CA3260A	BiMOS, CMOS Output, High Input Impedance	1	4	10	2.0	5.0pA	2-8	0.6
CA5260A	Mil Temp Version of CA3260A	1	3	5	2.0	5.0pA	2.25-8	0.6
CA158A	Wide Supply Range, Mil Temp	1	1	0.25	1.0	0.02	1.5-16	0.75
CA1558	Low Cost, Mil Temp Range	1	1	0.5	1.0	0.08	5-22	1.7
LM358	Wide Supply Range, Low Cost	1	1	0.5	2.0	0.05	1.5 - 16	0.7
LM1458	Low Cost	1	1	0.5	2.0	0.08	5-18	1.7
LM2904	Wide Supply Range, Ind. Temp	1	1	0.5	2.0	0.05	1.5 - 13	0.7
HA-5112	Low Noise, High Performance, Uncompensated	10	60	20	0.5	0.13	3-20	1.5
QUAD								
CA5470	High Input Impedance, Wide Supply Range, Mil Temp	1	14	5	5.0	1.0pA	1.5-8	2.5
HA-5104	Low Noise, High Performance	1	8	3	0.5	0.13	3-20	1.25
CA124	Wide Supply Range, Mil Temp	1	1	0.5	2.0	0.045	2.5-16	0.2
HA-4741	Quad 741, Wide Supply	1	3.5	1.6	0.5	0.06	2-20	4.5
HA-5114	Low Noise, High Performance, Uncompensated	10	60	20	0.5	0.13	3-20	1.25
LM2902	Low Cost, Ind. Temp	1	1	0.5	2.0	0.04	2.5 - 16	0.2
LM324	Low Cost	1	1	0.5	2.0	0.05	2.5 - 16	0.2

NOTE:

1. Can be compensated to unity gain.

NOTE: Bold type designates a new product from Harris.

PRECISION OPERATIONAL AMPLIFIERS



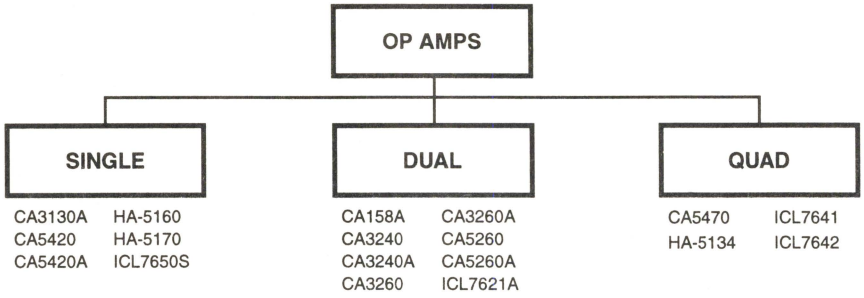
SINGLE		DUAL		QUAD	
HA-5127A	HA-5147A	CA158A	HA-5112	CA124	HA-5104
HA-5130	HA-5147	CA258A	HA-5142	CA224	HA-5114
HA-5135	HA-5170	CA358A	HA-5222	CA324	HA-5134
HA-5137	HA-5221	CA3280A	ICL7621A	CA2902	HA-5144
HA-5137A	ICL7650S	HA-5102			

PRECISION: Min/Max Limits at 25°C, Unless Otherwise Specified

DEVICE	OFFSET VOLTAGE (mV)	V_{IO} DRIFT (TYP) (µV/°C)	BIAS CURRENT (nA)	OFFSET CURRENT (nA)	CMRR (dB)	PSRR (dB)	GBWP (TYP) (MHz)	SLEW RATE (TYP) (V/µs)	A_{VOL} (dB)	SUPPLY CURRENT (mA/OP AMP)
SINGLE OP AMPS										
ICL7650S	0.005	0.02	0.01	0.02	120	120	2.0	2.5	135	3.0
HA-5127A	0.025	0.20	40.0	35.0	114	108	8.5	10.0	120	4.0
HA-5130	0.025	0.40	2.0	2.0	110	100	2.5	0.8	120	1.7
HA-5137A	0.025	0.20	40.0	35.0	114	108	63.0	20.0	120	4.0
HA-5147A	0.025	0.20	40.0	35.0	114	108	120.0	35.0	120	4.0
HA-5135	0.075	0.40	4.0	4.0	106	94	2.5	0.8	120	1.7
HA-5137	0.100	0.40	80.0	75.0	100	96	63.0	20.0	117	4.0
HA-5147	0.100	0.40	80.0	75.0	100	96	120.0	35.0	117	4.0
HA-5170	0.300	2.0	0.1	0.03	85	85	8.0	8.0	109	2.5
HA-5221	0.750	0.5	80.0	50.0	86	86	100.0	35.0	106	11.0
DUAL OP AMPS										
HA-5222	0.75	0.5	80	50	86	86	100.0	35.0	106	11.0
CA158A	2.0	7.0	50	10	70	65	1.0	0.5	94	1.5
HA-5102	2.0	3.0	200	75	86	86	8.0	3.0	100	2.5
HA-5112	2.0	3.0	200	75	86	86	60.0	20.0	100	2.5
ICL7621A	2.0	10.0	0.05	0.03	76	80	0.5	0.16	86	0.25
CA3280A	0.5	3.0	5000	700	94	94	9.0	125.0	94	2.4
CA258A	3.0	7.0	80	15	70	65	1.0	0.5	94	1.5
CA358A	3.0	7.0	100	30	65	65	1.0	0.5	88	1.5
HA-5142	6.0	3.0	100.0	10.0	77	77	0.4	1.5	86	0.15
QUAD OP AMPS										
HA-5134	0.2	0.3	50.0	50.0	100	100	4.0	1.0	118	2.0
HA-5114	2.5	3.0	200.0	75.0	86	86	60.0	20.0	100	1.63
HA-5104	2.5	3.0	200.0	75.0	86	86	8.0	3.0	100	1.63
CA124	5.0	7.0	150.0	30.0	70	65	1.0	0.5	94	0.5
HA-5144	6.0	3.0	100.0	10.0	77	77	0.4	1.5	86	0.15
CA224	7.0	7.0	250.0	50.0	65	65	1.0	0.5	88	0.5
CA324	7.0	7.0	250.0	50.0	65	65	1.0	0.5	86	0.5
LM2902	10.0	7.0	500.0	200.0	-	-	1.0	0.5	83	0.3

NOTE: Bold type designates a new product from Harris.

LOW BIAS CURRENT OPERATIONAL AMPLIFIERS

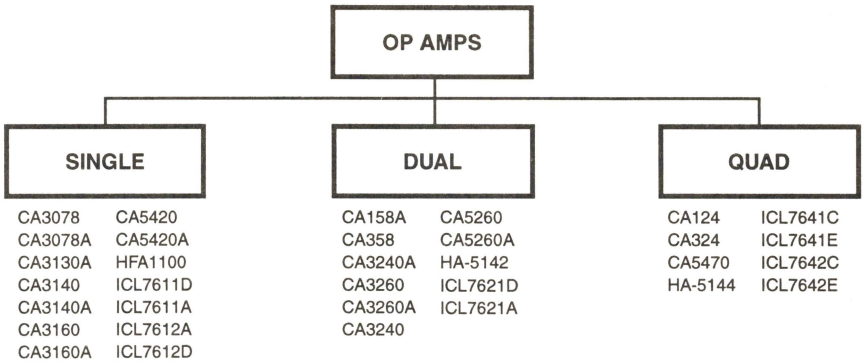


LOW BIAS CURRENT: Min/Max Limits at 25°C, Unless Otherwise Specified

DEVICE	BIAS CURRENT (nA)	OFFSET CURRENT (nA)	OFFSET VOLTAGE (mV)	CM RANGE AT NOMINAL SUPPLIES (V)	A_{VOL} (dB)	GBWP (TYP) (MHz)	SLEW RATE (TYP) (V/μs)	CMRR (dB)	PSRR (dB)	SUPPLY CURRENT (mA/OP AMP)
SINGLE OP AMPS										
CA5420A	0.001	0.0005	5.0	-0 to +3.7 at +5, -0	85	0.5	0.5	75	75	0.5
CA5420	0.002	0.001	10.0	-0 to +3.7 at +5, -0	85	0.5	0.5	70	70	0.5
ICL7650S	0.01	0.02	0.005	-5 to +3.5 at +5, -5	135	2.0	2.5	120	120	3.0
CA3130A	0.03	0.02	5.0	-0 to +10.0 at +15, -0	94	15.0	30.0	80	76	15.0
HA-5160	0.05	0.01	3.0	-10.0 to +10.0 at +15, -15	98	100.0	120	74	74	10.0
HA-5170	0.10	0.03	0.3	-10.0 to +10.0 at +15, -15	110	8.0	8.0	90	90	2.5
DUAL OP AMPS										
CA5260	0.015	0.01	15.0	-0 to +2.5 at +5, -0	80	3.0	5.0	70	70	1.0
CA5260A	0.015	0.01	4.0	-0 to +2.5 at +5, -0	83	3.0	5.0	80	75	1.0
CA3260A	0.03	0.02	5.0	-0 to +10.0 at +15, -0	94	4.0	10.0	80	76	1.5
CA3240A	0.04	0.02	5.0	-15 to +12.0 at +15, -15	86	4.5	9.0	70	76	6.0
CA3240	0.05	0.03	15.0	-15 to +11.0 at +15, -15	86	4.5	9.0	70	76	6.0
CA3260	0.05	0.03	15.0	-0 to +10.0 at +15, -0	94	4.0	10.0	70	70	1.5
ICL7621A	0.05	0.03	2.0	-4.2 to +4.2 at +5, -5	86	0.5	0.16	76	80	0.25
CA158A	50.0	10.0	2.0	-15 to +13.5 at +15, -15	94	1.0	0.5	70	65	1.5
QUAD OP AMPS										
CA5470	0.05	0.05	25.0	-0 to +3.5 at +5, -0	80	14.0	5.0	55	60	3.0
ICL7641	0.05	0.03	10.0	-3.7 to +3.7 at +5, -5	76	1.4	1.6	60	70	2.5
ICL7642	0.05	0.03	10.0	-4.4 to +4.4 at +5, -5	80	0.04	0.02	70	80	0.03
HA-5134	50.0	50.0	0.2	-10 to +10 at +15, -15	118	4.0	1.0	100	100	2.0

NOTE: Bold type designates a new product from Harris.

5V SINGLE-SUPPLY OPERATIONAL AMPLIFIERS



5V SINGLE-SUPPLY: Min/Max Limits at 25°C, Unless Otherwise Specified

DEVICE	SUPPLY CURRENT (TYP) (mA/OP AMP)	INPUT OFFSET VOLTAGE (mV)	DOES INPUT INCLUDE GROUND?	RAIL-TO-RAIL OUTPUT?	INPUT BIAS CURRENT (nA)	GAIN BANDWIDTH PRODUCT (TYP) (MHz)	SLEW RATE (TYP) (V/μs)	MINIMUM SINGLE SUPPLY VOLTAGE (V)	OUTPUT SHORT CIRCUIT CURRENT (TYP) (mA) SOURCE = + SINK = - SUPPLY AT 5V, 0V
SINGLE OP AMPS									
ICL7612A	0.01	2	Yes	Yes	0.05	0.04	0.016	2.0	+12.5, -0.8
ICL7611A	0.01	2	No	Yes	0.05	0.04	0.016	2.0	+12.5, -0.8
ICL7612D	0.01	15	Yes	Yes	0.05	0.04	0.016	2.0	+12.5, -0.8
ICL7611D	0.01	15	No	Yes	0.05	0.04	0.016	2.0	+12.5, -0.8
CA3078A (Note 1)	0.025	3.5	No	No	12	0.3	0.5	1.5	+12.0, -12.0
CA3078 (Note 1)	0.13	4.5	No	No	170	2.0	1.5	1.5	+12.0, -12.0
CA3130A (Note 1)	0.30	5	Yes	Yes	0.03	15	10	5.0	+3.2, -2.2
CA3130 (Note 1)	0.30	15	Yes	Yes	0.05	15	10	5.0	+3.2, -2.2
CA3160A (Note 1)	0.30	5	Yes	Yes	0.03	4	10	5.0	+3.2, -2.2
CA3160 (Note 1)	0.30	15	Yes	Yes	0.05	4	10	5.0	+3.2, -2.2
CA5420A	0.40	5	Yes	Yes	0.001	0.5	0.5	2.0	+2.6, -2.4
CA5420	0.40	10	Yes	Yes	0.002	0.5	0.5	2.0	+2.6, -2.4
CA3140A (Note 1)	1.60	5	Yes	No	0.04	3.7	9	4.0	+10.0, -1.0
CA3140 (Note 1)	1.60	15	Yes	No	0.05	3.7	9	4.0	+10.0, -1.0

NOTE: Bold type designates a new product from Harris.

5V SINGLE-SUPPLY: Min/Max Limits at 25°C, Unless Otherwise Specified **(Continued)**

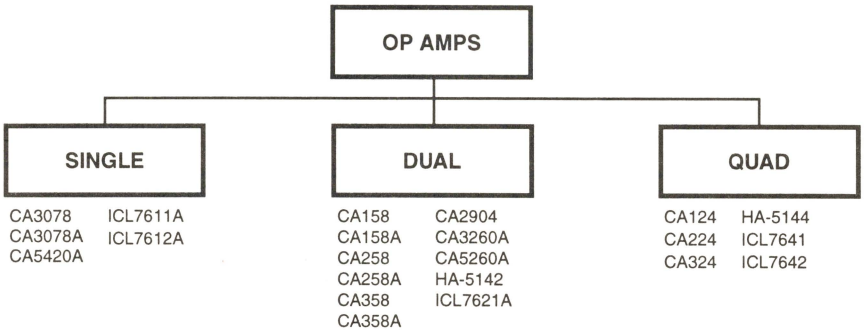
DEVICE	SUPPLY CURRENT (TYP) (mA/OP AMP)	INPUT OFFSET VOLTAGE (mV)	DOES INPUT INCLUDE GROUND?	RAIL-TO-RAIL OUTPUT?	INPUT BIAS CURRENT (nA)	GAIN BANDWIDTH PRODUCT (TYP) (MHz)	SLEW RATE (TYP) (V/µs)	MINIMUM SINGLE SUPPLY VOLTAGE (V)	OUTPUT SHORT CIRCUIT CURRENT (TYP) (mA) SOURCE = + SINK = - SUPPLY AT 5V, 0V
HFA1100	**5.5**	**6.0**	**No**	**No**	**40000**	**300**	**500**	**4.5**	**-**
DUAL OP AMPS									
HA-5142	0.05	6	Yes	No	100	0.4	1.5	3.0	+4.5, -4.5
ICL7621A (Note 1)	0.10	2	No	Yes	0.05	0.5	0.16	2.0	+12.5, -0.4
ICL7621D (Note 1)	0.10	15	No	Yes	0.05	0.5	0.16	2.0	+12.5, -0.4
CA158A	0.35	3	Yes	No	100	1	0.5	3.0	+40, -20
CA358	0.35	7	Yes	No	250	1	0.5	3.0	+40, -20
CA3260A (Note 1)	0.60	5	Yes	Yes	0.03	4	10	4.0	+3.2, -2.2
CA3260 (Note 1)	0.60	15	Yes	Yes	0.05	4	10	4.0	+3.2, -2.2
CA5260A	0.80	4	Yes	Yes	0.015	3	5	4.5	+2.2, -2.0
CA5260	0.80	15	Yes	Yes	0.015	3	5	4.5	+2.2, -2.0
CA3240A (Note 1)	2.00	5	Yes	No	0.04	3.7	9	5.0	+20.0, -1.0
CA3240 (Note 1)	2.00	15	Yes	No	0.05	3.7	9	5.0	+20.0, -1.0
QUAD OP AMPS									
ICL7642C	0.01	10	No	Yes	0.05	0.044	0.016	2.0	+10.0, -0.05
ICL7642E	0.01	20	No	Yes	0.05	0.044	0.016	2.0	+12.5, -0.05
HA-5144	0.05	6	Yes	No	100	0.4	1.5	3.0	+4.5, -4.5
CA324	0.20	7	Yes	No	250	1	0.5	5.0	+40, -20
CA124	0.20	5	Yes	No	150	1	0.5	5.0	+40, -20
ICL7641C (Note 1)	1.00	10	No	Yes	0.05	1.4	1.6	5.0	+12.5, -0.8
ICL7641E (Note 1)	1.00	20	No	Yes	0.05	1.4	1.6	5.0	+12.5, -0.8
CA5470	1.50	22	Yes	No	0.05	14	5	3.0	+5.5, -1.2

NOTES:

1. Limits are for single 5V operation if data is available in data sheet.
2. Supply Current for single 5V supply, if specified in data sheet.

NOTE: Bold type designates a new product from Harris.

LOW POWER OPERATIONAL AMPLIFIERS



LOW POWER: Min/Max Limits at 25°C, Unless Otherwise Specified (Note 1)

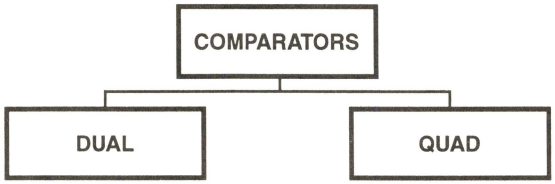
DEVICE	SUPPLY CURRENT (mA/OP AMP)	SUPPLY VOLTAGE RANGE (±V)	SLEW RATE (TYP) (V/μs)	GBWP (TYP) (MHz)	CM RANGE AT NOMINAL SUPPLY (V)	OUTPUT VOLTAGE SWING (V)	OUTPUT SHORT CIRCUIT CURRENT (TYP) (mA) SOURCE = + SINK = -	OFFSET VOLTAGE (mV)	BIAS CURRENT (nA)	PSRR (dB)
SINGLE OP AMPS										
CA3078A	0.02	0.75-18	0.5	0.3	-5 to +5 at +6, -6	±5.1	±12.0	3.5	12.0	70
ICL7611A	0.02	1.0-9.0	0.02	0.044	-4.4 to +4.4 at +5, -5	±4.9	+25.0, -7.0	2.0	0.05	80
ICL7612A	0.02	1.0-9.0	0.02	0.044	-5.3 to +5.3 at +5, -5	±4.9	+25.0, -7.0	2.0	0.05	80
CA3078	0.13	0.75-7.0	1.5	2.0	-5 to +5 at +6, -6	±5.1	±12.0	4.5	170.0	70
CA5420A	0.55	1.0-11.0	0.5	0.5	-0 to +3.7 at +5, -0	+4.9, +0.15	+2.6, -2.4	5.0	0.005	70
DUAL OP AMPS										
HA-5142	0.15	1.5-17.5	1.5	0.4	-0 to +3.0 at +5, -0	+3.8, +1.0	+4.5, -4.5	6.0	100	77
ICL7621A	0.25	1.0-9.0	0.16	0.5	-4.2 to +4.2 at +5, -5	±4.9	+15.0, -0.9	2.0	0.05	80
CA158A	1.5	1.5-16.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15.0	+40.0, -20	2.0	50.0	65
CA258A	1.5	1.5-16.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15.0	+40.0, -20	3.0	80.0	65
CA2904	1.5	1.5-13.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15.0	+40.0, -20	7.0	250.0	50
CA258	1.5	1.5-16.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15.0	+40.0, -20	5.0	150.0	65
CA358	1.5	1.5-16.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15.0	+40.0, -20	7.0	250.0	65
CA158	1.5	1.5-16.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15.0	+40.0, -20	5.0	150.0	65
CA358A	1.5	1.5-16.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15.0	+40.0, -20	3.0	100.0	65
CA3260A	1.5	2.0-8.0	10	4	-0 to +10 at +15, -0	+14.99, +0.01	+22.0, -20	5.0	0.03	77
CA5260A	2.0	2.25-8.0	5.0	3.0	-0 to +2.5 at +5, -0	+4.99, +0.01	+2.2, -2.0	5.0	0.030	76
QUAD OP AMPS										
ICL7642	0.02	1.0-9.0	0.02	0.04	-4.4 to +4.4 at +5, -5	±4.5	+10, -0.08	10.0	0.05	80
HA-5144	0.15	1.5-17.5	1.5	0.4	-0 to +3 at +5, -0	+3.8, +1.0	+4.5, -4.5	6.0	100.0	77
CA124	0.5	2.5-16.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15	+40.0, -20	5.0	150.0	65
CA224	0.5	2.5-16.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15	+40.0, -20	7.0	250.0	65
CA324	0.5	2.5-16.0	0.5	1.0	-15 to +13.5 at +15, -15	+13.5, -15	+40.0, -20	7.0	250.0	65
ICL7641	2.5	1.5-9.0	1.6	1.4	-3.7 to +3.7 at +5, -5	±4.5	+25, -7.0	10.0	0.05	80

NOTE:

1. See "CM Range" column for the Nominal Supply Voltage at which these specifications apply.

NOTE: Bold type designates a new product from Harris.

COMPARATORS



COMPARATORS: Electrical Characteristics, $T_A = 25^oC$

TYPE	V_{IO} MAX (mV)	INPUT CURRENT MAX (nA)	SUPPLY CURRENT MAX (mA)	SUPPLY VOLTAGE RANGE V+, V- TYP (V)	A_{OL} MIN (dB)	RESPONSE TIME TYP (ns)	(NOTE 1) LEAD COUNT AND PACKAGE TYPE	COMMENTS
DUAL UNIT TYPES								
CA3290	20	50pA	3	+5, 0 to +18, -18	88	t_r = 1200 t_f = 200	8PDIP, 8Can	Low Cost
CA3290A	10	40pA	3	+5, 0 to +18, -18	88		8PDIP, 14PDIP, 8Can	
QUAD UNIT TYPES								
CA139	5	100	8	+2.5, 0 to +18, -18	-	t_r = 1300 t_f = 750	14PDIP, 14CERDIP, 14SOIC	Mil Temp Range
CA139A	2	100	8	+2.5, 0 to +18, -18	94		14PDIP, 14SOIC	Mil Temp Range
CA239	5	250	2	+2.5, 0 to +18, -18	-		14PDIP, 14CERDIP, 14SOIC	Ind Temp Range
CA239A	2	250	2	+2.5, 0 to +18, -18	94		14PDIP, 14CERDIP, 14SOIC	Ind Temp Range
CA339	5	250	2	+2.5, 0 to +18, -18	-		14PDIP, 14SOIC	Low Cost
CA339A	2	250	2	+2.5, 0 to +18, -18	94		14PDIP, 14SOIC	
LM339	5	250	2	+2.5, 0 to +18, -18	-		14PDIP	Low Cost
LM339A	2	250	2	+2.5, 0 to +18, -18	94		14PDIP	
LM2901	7	250	2	+2.5, 0 to +18, -18	-		14SOIC, 14PDIP	Low Cost, Ind Temp
LM3302	20	500	2	+2.5, 0 to +18, -18	-		14SOIC, 14PDIP	Low Cost, Ind Temp
HA-4900	2	75	+20, -8, +4 (Note 2)	+5, 0 to +16.5, -16.5	112	130	16CERDIP	Single or Dual Supply. Analog and Logic Supplies Separated for Easier Interface and Noise Immunity
HA-4902	2	150	+20, -8, +4 (Note 2)	+5, 0 to +16.5, -16.5	112	130	16CERDIP	
HA-4905	4	150	+20, -8, +4 (Note 2)	+5, 0 to +16.5, -16.5	112	130	16PDIP, 16CERDIP, 16SOIC (300 mil), 20PLCC	

NOTES:

1. See Linear Package Selection Guide.
2. Positive Supply Current, Negative Supply Current, Logic Supply Current.

NOTE: Bold type designates a new product from Harris.

SAMPLE AND HOLD AMPLIFIERS: Typical Values at 25°C, Unless Otherwise Specified

TYPE	SAMPLE/HOLD TYPE	TEMPERATURE RANGE	(NOTE 1) LEAD COUNT AND PACKAGE TYPE	ACQUISITION TIME (TO 0.01%)	HOLD STEP ERROR	APERTURE TIME	GAIN BANDWIDTH PRODUCT
HA1-2420-2	External Hold Cap, Low Cost	-55°C to 125°C	14CERDIP	3.2µs	10mV	30ns	2.5MHz (C_H = 1000pF)
HA1-2425-5		0°C to 75°C	14CERDIP				
HA3-2425-5		0°C to 75°C	14PDIP				
HA4P2425-5		0°C to 75°C	20PLCC				
HA9P2425-5		0°C to 75°C	14SOIC				
HA1-5320-2	High Speed, Low Charge Transfer, Precision, Includes Hold Capacitor	-55°C to 125°C	14CERDIP	1µs (C_H = Internal)	1mV	25ns	2.0MHz (C_H = 100pF)
HA1-5320-5		0°C to 75°C	14CERDIP				
HA1-5320/883		-55°C to 125°C	14CERDIP				
HA3-5320-5		0°C to 75°C	14PDIP				
HA4-5320/883		-55°C to 125°C	20CLCC				
HA9P5320-5		0°C to 75°C	16SOIC (300 mil)				
HA9P5320-9		-40°C to 85°C	16SOIC (300 mil)				
HA1-5330-5	Very High Speed, Precision, Monolithic, Includes Hold Capacitor	0°C to 75°C	14CERDIP	650ns	0.5mV	20ns	4.5MHz
HA1-5330-4		-25°C to 85°C	14CERDIP				
HA1-5330-2		-55°C to 125°C	14CERDIP				
HA1-5330/883		-55°C to 125°C	14CERDIP				
HA3-5330-5		0°C to 75°C	14PDIP				
HA4-5330/883		-55°C to 125°C	20CLCC				
HA1-5340-5	High Speed, Low Distortion, Includes Hold Capacitor	0°C to 75°C	14CERDIP	700ns	15mV	15ns	10MHz
HA1-5340-9		-40°C to 85°C	14CERDIP				
HA1-5340/883		-55°C to 125°C	14CERDIP				
HA3-5340-5		0°C to 75°C	14PDIP				
HA3-5340-9		-40°C to 85°C	14PDIP				
HA4-5340/883		-55°C to 125°C	20CLCC				
HA9P5340-5		0°C to 75°C	16SOIC (300 mil)				
HA5351IP	Ultra High Speed and Low Power, Includes Hold Capacitor, Low Pin Count	-40°C to 85°C	8PDIP	64ns	10mV	10ns	40MHz
HA5351IB		-40°C to 85°C	8SOIC				

NOTE:

1. See Linear Package Selection Guide.

NOTE: Bold type designates a new product from Harris.

DIFFERENTIAL AMPLIFIERS: Typical Values, Unless Otherwise Specified

TYPE	DESCRIPTION	(NOTE 4) FEATURES	FREQ. RANGE DC TO (MHz)	VOLTAGE GAIN (dB)	BW (3dB POINT) (MHz)	1/F NF (dB)	AGC RANGE (dB)	(NOTE 5) LEAD CT AND PKG TYPE
CA3028A	Differential/ Cascode Amplifiers	• Balanced Differential Amplifier Configuration with Controlled Constant Current Source • RF, IF and Video Frequency Capability • Balanced AGC Capability • Operation from DC to 500MHz • CA3028B is Controlled for Input Offset Voltage, Current, and Input Bias Current, and is Intended for "Balance" Requirements • Push-Pull Inputs and Outputs • CA3028 and CA3053 are Identical Except for 100MHz Noise Specification	120	40 (Note 1)	-	7.2	62	8PDIP, 8SOIC, 8Can
CA3028B			120	40	8	7.2	62	
CA3049	Dual High Frequency		500	22	1.35 (Note 2)	4.6	75	12Can
CA3053	Differential/Cascode Amplifier		120	40	Recommended for IF Amplifier Applications			8PDIP, 8Can
CA3054	Dual Independent		120	32	550 (Note 3)	3.25	75	14PDIP, 14SOIC
CA3102	Dual High Frequency		500	22	1.35 (Note 2)	4.6	75	14PDIP, 14SOIC

NOTES:

1. Power Gain (G_P) Min. at 100MHz: Cascode = 16dB; Differential Amplifier = 14dB.
2. GHz.
3. f_T (MHz).
4. T_A Range: -55°C to 125°C except for type CA3054 (0°C to 85°C).
5. See Linear Package Selection Guide.

TRANSISTOR ARRAYS: Electrical Characteristics $T_A = 25°C$

TYPE	DESCRIPTION	$V_{(BR)\ CEO}$ (MIN) V	$V_{(BR)\ CBO}$ (MIN) V	h_{FE} (MIN)	I_C (MAX) mA	(NOTE 1) LEAD COUNT AND PACKAGE TYPE
CA3045	Three Transistors Plus a Differential Pair	15	20	40	50	14CERDIP, 14SBDIP
CA3046		15	20	40	50	14PDIP, 14SOIC
		f_T > 300MHz. 2 matched pairs ±5mV				
CA3081	General-Purpose NPN High-Current Transistors	16	20	40	100	16PDIP, 16CERDIP, 16SOIC (150 mil)
		Seven Common-Emitter				
CA3082		16	20	40	100	16PDIP, 16CERDIP, 16SOIC (150 mil)
		Seven Common-Collector				
CA3083		15	20	40	100	16PDIP, 16CERDIP, 16SOIC (150 mil)
		Five independent transistors. Q_1 and Q_2 matched; I_{IO} (at 1mA) 2.5µA Max				
CA3086	Three Isolated Transistors Plus a Differential Pair	15	20	40	50	14PDIP, 14CERDIP, 14SOIC
		f_T > 550MHz Typ Operation from DC to 120MHz				
CA3127	Five Independent Transistors	15	20	40	20	16PDIP, 16SOIC (150 mil)
		f_T > 1GHz. Operation from DC to 500MHz				

NOTE: Bold type designates a new product from Harris.

TRANSISTOR ARRAYS: Electrical Characteristics $T_A = 25^oC$ **(Continued)**

TYPE	DESCRIPTION	$V_{(BR)\ CEO}$ (MIN) V	$V_{(BR)\ CBO}$ (MIN) V	h_{FE} (MIN)	I_C (MAX) mA	(NOTE 1) LEAD COUNT AND PACKAGE TYPE
CA3146	Three Transistors Plus a Differential Pair	30	40	30	50	14PDIP, 14SOIC
CA3146A		40	50	30	50	
		f_T > 500MHz Typ Operation from DC to 120MHz				
CA3183	Five High-Current Transistors	30	40	40	75	16PDIP, 16SOIC (150 mil)
CA3183A		40	50	40	75	
		High-Voltage Versions of CA3083 Transistors Q_1 and Q_2 Matched at 1mA				
CA3227	Five Independent Transistors	8	12	40	20	16PDIP, 16SOIC (150 mil)
		f_T = 3GHz Typ Operation from DC to 1.5GHz				
CA3246	Three Independent Transistors Plus a Differential Pair	8	12	40	20	14PDIP, 14SOIC
		f_T = 3GHz Typ Operation from DC to 1.5GHz				

TYPE	DESCRIPTION	$V_{(BR)\ CEO}$ (MIN) V NPN/PNP	$V_{(BR)\ CBO}$ (MIN) V NPN/PNP	h_{FE} (MIN) NPN/PNP	I_C (MAX) NPN/PNP	(NOTE 1) LEAD COUNT AND PACKAGE TYPE
CA3096	Five Independent Transistors, 3 NPN, 2 PNP	35/-40	45/-40	150/20	50/-10	16PDIP, 16SOIC (150 mil)
CA3096A		35/-40	45/-40	150/20	50/-10	
CA3096C		24/-24	30/-24	100/15	50/-10	16PDIP
		NPN		PNP		
		$\lvert V_{IO}\rvert$ = 5mV Max		5mV Max		
		$\lvert I_{IO}\rvert$ = 0.6µA Max		0.25µA Max		
HFA3046	Three 8GHz NPN Transistors Plus an NPN Differential Pair	8	12	40	15	14SOIC
		$\lvert V_{IO}\rvert$ = 5mV Max				
HFA3096	Three 8GHz NPN Transistors Plus Two 5.5GHz PNP Transistors	8	12/10	40/25	15	16SOIC (150 mil)
		NF = 3.5dB at 1GHz				
HFA3127	Five Independent 8GHz NPN Transistors	8	12	40	15	16SOIC (150 mil)
		NF = 3.5dB at 1GHz				
HFA3128	Five Independent 5.5GHz PNP Transistors	8	10	25	15	16SOIC (150 mil)
		NF = 3.5dB at 1GHz				
HFA3134	**8.5GHz NPN Matched Pair**	**11 (Note 2)**	**12**	**48**	**26**	**6SOT-23**
		NF = 2.5dB at 900MHz, V_{BE} Match = 6mV, h_{FE} Match = 8%				
HFA3135	**7GHz PNP Matched Pair**	**11 (Note 2)**	**12**	**15**	**26**	**6SOT-23**
		NF = 4.5dB at 900MHz, V_{BE} Match = 6mV, h_{FE} Match = 8%				

NOTES:

1. See Linear Package Selection Guide.
2. $R_B \leq 10k\Omega$

NOTE: Bold type designates a new product from Harris.

DIODE ARRAYS: $T_A = 25^oC$. Apply for Each Diode

TYPE	DESCRIPTION	$V_{(BR)R}$ (MIN) V	I_R (MAX) µA	C_D (TYP) pF	$V_{F1} - V_{F2}$ (MAX) mV	(NOTE 1) LEAD COUNT AND PACKAGE TYPE
CA3039	6 Individual	5	0.1	0.65	5 (I_F =1mA)	14SOIC, 12Can
		Ultra-Fast Low-Capacitance Matched Diodes				

NOTES:

1. See Linear Package Selection Guide.
2. Six connected to form 3 common-cathode pairs. Four connected to form 2 common-anode diode pairs.

SPECIAL ANALOG CIRCUITS

TYPE	DESCRIPTION	DOCUMENT NUMBER
CA555, LM555	Timers for Timing Delays and Oscillator Applications in Commercial, Industrial and Military Equipment	834
CA1391, CA1394	TV Horizontal Processors	981
CA3089	FM IF System	561
CA3126	TV Chroma Processor	860
CA3189	FM IF System	1046
CA3256	BiMOS Analog Video Switch and Amplifier	1769
CD22402	Sync Generator for TV Applications and Video Processing Systems	1686
HA-2546	Wideband Two Quadrant Voltage Output Analog Multiplier	2861
HA-2556	Wideband Four Quadrant Voltage Output Analog Multiplier	2477
HA-2557	Wideband Four Quadrant Current Output Analog Multiplier	2478
HA7210	Low Power Crystal Oscillator, 10kHz to 10MHz	3389
HA7211	Low Power Crystal Oscillator, 10kHz to 10MHz	3389
HFA5251	Ultra High-Speed Monolithic Pin Driver (800MHz)	3689
HFA5253	Wide Swing Ultra High-Speed Pin Driver (800MHz)	4003
ICL8013	Four Quadrant Analog Multiplier	2863
ICL8038	Precision Waveform Generator/Voltage Controlled Oscillator	2864
ICM7242	Long Range Fixed Timer	2866
ICM7555, ICM7556	General Purpose Timers	2867

NOTE: Bold type designates a new product from Harris.

Consumer Products

HORIZONTAL/VERTICAL COUNTDOWN AND SYNC PROCESSORS CA1391, CA1394, CA3154

- Horizontal Oscillator/Drivers
- Horizontal Processors with 64, 32, 16, or 8 Divide Ratios
- CMOS Sync Generator With Genlock and Alternate Field Output
- PAL and NTSC Compatible
- Useful as Sync or Clock Regenerators

CHROMA/LUMA PROCESSORS AND DEMODULATORS CA3070, CA3128Q, CA3126

- VCO with Phase Control and Shunt Regulator
- 3.58MHz Demodulator and Carrier Regenerator
- PAL Chroma Processor
- Single Chip PAL Luma/Chroma; Video to RGB Converter
- Single Chip Chroma/Luma; Video to RGB Converter
- Video/Chroma Processor

MISCELLANEOUS RADIO/TV FUNCTIONS CA3224E, CA3253

- Automatic CRT Bias Circuit
- IR Receiver Preamp and Demodulator
- AM Receiver
- TV Sound Demodulator and Audio AMP

SECURITY AND SURVEILLANCE CA3253, CA3254, CA3255

- Vidicon Bias and AMP
- RS-170 Sync Generator for Camera Application
- PAL or NTSC Versions
- Universal Detection and Alarm Circuit

PRESCALERS/BAND SWITCHES CA3163E, CA3179E

- TTL and CMOS Compatible
- Low Drive Current Input Requirement
- High Output Current Sink Capability

IF AMPLIFIER AND DETECTOR CA2111A, CA3102, CA3014, CA3089, CA3189

- FM IF Amplifiers with Limiters and Detectors
- Wide Band Amplifiers
- Wide Band Discriminator/Amplifiers
- Electronic Attenuators
- Quadrature Detect, AGC, and Log Output Devices
- FM IFs with Channel Detection
- TV Picture IFs

HORIZONTAL/VERTICAL COUNTDOWN AND SYNC PROCESSORS

CA1391, CA1394
TV HORIZONTAL PROCESSORS

- CA1391E - Positive Horizontal Sawtooth Input
- CA1394E - Negative Horizontal Sawtooth Input
- Internal Shunt Regulator
- Linear Balanced Phase Detector
- Preset Hold Control Capability
- Pull-In (Typ). . . . . ±300Hz
- Low Thermal Frequency Drift
- Small Static Phase Error
- Variable Output Duty Cycle
- Adjustable DC Loop Gain

CA3154
TV SYNC/AGC/HORIZONTAL SIGNAL PROCESSOR

- Horizontal Oscillator With AFC
- Sync Separator With Noise Immunity
- Strobed AGC System
- If AGC Output
- Delayed Outputs For Forward Or Reverse AGC Tuners
- Internal Noise Threshold
- High Impedance Video Input
- Choice Of Dual External Time Constants For Sync Separator Noise Immunity
- RF AGC Delay Externally Controlled
- Output Short-Circuit Protection

CD22402
CMOS LSI SYNC GENERATOR

- Interlaced Composite Sync Output
- Automatic Genlock Capability
- Crystal Oscillator Operation
- Operation . . . . . 525 Line or 625 Line
- Vertical Reset Option
- Wide Power Supply Operating Voltage. . . . . 4V to 15V
- Applications
  - Cameras
  - Monitors and Displays
  - CATV
  - Teletext
  - Video Games and Video Service Instruments
  - Sync Restorer
  - Scrambling/Descrambling Equipment

MISCELLANEOUS RADIO/TV FUNCTIONS

CA3088E
AM RECEIVER SUBSYSTEM AND GENERAL PURPOSE AMPLIFIER ARRAY

- Excellent Overload Characteristics
- AGC for IF Amplifier
- Buffered Output Signal for Tuning Meter
- Internal Zener Diode Provides Voltage Regulation
- Applications
  - AM Broadcast and Communications Receivers
  - AM Converter
  - IF Amplifiers
  - Detector
  - Audio Preamplifier

CA3224E
AUTOMATIC PICTURE TUBE BIAS CIRCUIT

- Automatic Picture Tube Bias Cutoff Control
- Automatic Background Color Balance
- Eliminates Grey Scale Adjustments
- Compensates For Cathode-to-Heater Leakage

IF AMPLIFIERS AND DETECTORS

CA2111A
FM IF AMPLIFIER-LIMITER AND QUADRATURE DETECTOR

- Direct Replacement for ULN2111A and MC1357
- Good Sensitivity:
  - Input Limiting Voltage (Knee) 400mV
  - Typ 10.7MHz; 250mV
  - Typ . . . . . .4.5MHz and 5.5MHz
- Excellent AM Rejection
  - 45dB (Typ) 10.7MHz
- Provision for Output From 3-Stage IF Amplifier Section
- Applications
  - FM IF and TV Sound IF Applications

CA3012
WIDEBAND AMPLIFIERS

- Exceptionally High Amplifier Gain
  - Power Gain (Typ) . . . . . .4.5MHz - 75dB
- Excellent Limiting Characteristics
  - Input Limiting Voltage (Knee) 600μV
    Typ 10.7MHz
- Wide Frequency Capability
  - 100kHz to > 20MHz

CA3014
WIDEBAND AMPLIFIER DISCRIMINATORS

- Exceptionally High Gain
  - Power Gain (Typ) . . . . . .4.5MHz - 75dB
- Excellent Limiting Characteristics
  - Input Limiting Voltage (Knee) 300mV
    Typ 4.5MHz
- Excellent AM Rejection
  - >50dB. 4.5MHz
- High Audio-Voltage Recovery
  - 220mV (Typ). . . . . 4.5MHz, 25kHz Deviation

CA3089
FM IF SYSTEM
CA3189
FM IF SYSTEM WITH ON CHANNEL DETECTOR

- Exceptional Limiting Sensitivity
  - 12mV (Typ) . . . . . .-3dB Point
- Low Distortion
  - 0.1% (Typ) (with Double Tuned Coil)
- Single Coil Tuning Capability
- Improved S + N/N Ratio
- Externally Programmable Recovered Audio Level
- Provides Specific Signal for Control of Interchannel Muting (Squelch)
- Provides Specific Signal for Direct Drive of a Tuning Meter
- On Channel Step for Search Control
- Provides Programmable AGC Voltage for RF Amplifier
- Provides a Specific Circuit for Flexible Audio Output
- Internal Supply Voltage Regulators
- Applications
  - FM IF Amplifier Applications In High-Fidelity
  - Automotive
  - Communications Receivers
  - IF Amplifier
  - Quadrature Detector
  - AF Preamplifier,
  - Specific Circuits for AGC
  - AFC, Muting (Squelch)
  - Tuning Meter

PRESCALERS/BAND SWITCHES

CA3247
ANALOG INTERFACE UNIT (AIU)

- Frequency Synthesizer for TV and CATV Channels (with 4MHz Crystal Oscillator for Reference)
- Interfaces to Microprocessor and Tuner for Receiver Controls
- Circuit to Decode Remote Control Transmissions
- On Screen Display (OSD) With RGB Signal Output
- 9 D/A Converters for Analog Control Functions
- PLL Control of Tuner Interface Circuits
- Three Wire Serial Bus Interface
- Applications
  - For Television and CATV Tuning/Interface Control
  - Tuner Test Equipment
  - Remote

CA3238E
BIMOS INPUT OP AMP, FREQUENCY BAND-SELECT SWITCH AND QUAD COMPARATOR

- Input Operational Amplifier - High Impedance PMOS Input Transistors and Internal Reference Bias
- Low Input Bias Current and Internal Diode Protection at Op Amp Inputs
- High Op Amp Output Voltage Swing . . . . . 0.2V-28V DC with 3mA Source or Sink Capability
- Logic Controlled Bandswitching with Four Separate Outputs
- Two Bandswitch Output Current Sinks
- Two Bandswitch Current-Limited Output Current Sources
- Internally Referenced Quad Comparator
- Low Input Drive Current Requirement
- Low Output Leakage
- High Output Current Sink Capability
- Bipolar and PMOS Processes on a Single Chip
- Applications
  - Television Tuning Interfacing

CA3163E
VHF/UHF PRESCALER ÷64/256

- Broadband Operation. . . . . 90MHz to 1000MHz
- High Sensitivity
- Standard Power Supply 5V
- Dual Mode Operation
  - VHF/UHF

CA3179E
1.25GHz PRESCALER

- Broadband Operation
  - DC to 1.25GHz
- High Sensitivity
- Standard T^2L or ECL Power Supply
- Dual Mode Operation
  - VHF/UHF. . . . . ÷64/÷256

CA3232E
÷20 PRESCALER

- Operation 200MHz
- TTL and CMOS Compatible
- Power Supply 5V
- Open Collector Output Stage
- Applications
  - Digital Synthesizers
  - Counters
  - AM/FM Communications Circuit

CA3263
TV TUNER CONTROL CIRCUIT INVERTER, OPERATIONAL AMPLIFIER, FREQUENCY AND BAND-SELECT SWITCH

- 2 Input - 4 Output Bandswitch
- High-Output Current Drive - Low Saturation Voltage
- Applications
  - TV and CATV Use
  - Frequency or Voltage Synthesizer Television Tuning Systems

CHROMA/LUMA SYSTEMS

CA3070
TELEVISION CHROMA SYSTEM

- Voltage Controlled Oscillator
- Keyed APC and ACC Detectors
- DC Hue Control
- Shunt Regulator

CA3128Q
TV CHROMA PROCESSOR FOR PAL SYSTEMS

- Phase-Locked Subcarrier Regeneration Utilizes Sample-and-hold Techniques in the Automatic Frequency Phase Control (AFPC) Servo Loop
- Automatic Chrominance Control (ACC)/Killer Detector Employes Sample-and-Hold Techniques
- Supplementary ACC with an Overload Detector to Prevent Oversaturation of the Picture Tube
- Sinusoidal Subcarrier Output

CA3126
TV CHROMA PROCESSOR AND CARRIER REGENERATOR

- Phase-Locked Subcarrier Regeneration Utilizes Sample-and-Hold Techniques
- Automatic Chrominance Control (ACC)/Killer Detector Employs Sample-and-Hold Techniques
- Supplementary ACC with An Overload Detector to Prevent Oversaturation of the Picture Tube
- Sinusoidal Subcarrier Output
- Keyed Chroma Output
- Emitter-Follower Buffered Outputs For Low Output Impedance
- Linear DC Saturation Control

SECURITY AND SURVEILLANCE

CA3253
VIDEO PROCESSOR

- Video Amplifier
- AGC Amplifier
- Blanking Pulse and Sync Pulse Addition
- Black Clipping
- Applications
  - All RS-170 Sync Systems
  - Security Cameras
  - CCTV Systems
  - Cable Systems
  - Text Encoder Sync
  - Computer Display Systems
  - Graphic Systems
  - Video Camera

CA3254, CA3255
RS-170 SYNC GENERATOR (CA3254)

- Single LSI IC with Multiple Genlock Capability
- EIA RS-170 Sync with 2:1 Interlace
- PLL for Lock to Power Line Zero Crossing
- Genlocks to RS-170, RS-330 or Random Interlace
- Crystal Control Mode Sync Option
- Four Modes of Genlock Control
- I^2L Injection Configured to Work in Series with the Camera Tube Filament
- Applications
  - All RS-170 Sync Systems
  - Security Cameras
  - CCTV Systems
  - Cable Systems
  - Text Encoder Sync
  - Computer Display Systems
  - Graphics Systems

AUTOMOTIVE SPECIAL FUNCTION

CA3165
ELECTRONIC SWITCHING CIRCUIT

- Switching Initiated by Damping of Internal Oscillator
- Proximity Sensing of Rotational Motion
- Repeatable Timing of Switching States
- Five Outputs - Two Complementary Pairs and One Non-Inverting Output (CA3165E1)
- Two Outputs - One Complementary Pair (CA3165E)

Linear SPICE Model Listing

PART NUMBER	DESCRIPTION	RELATED LITERATURE
CA158	Dual 1MHz General Purpose Op Amp	MM158
CA3018 (Note)	500MHz NPN Transistor Array	N/A
CA3046	550MHz NPN Transistor Array	MM9701
CA3083	450MHz High Current NPN Transistor Array	MM9710
CA3086	550MHz NPN Transistor Array	MM9701
CA3096	335MHz NPN, 6.8MHz PNP Transistor Array	MM9710
CA3127	1.1GHz NPN Transistor Array	MM9701
CA3227	3.0GHz NPN Arrays (See Data Sheet for Model)	See Data Sheet
CA3246	3.0GHz NPN Arrays (See Data Sheet for Model)	See Data Sheet
HA-2500	Precision, High Slew Rate Op Amp	MM2500
HA-2502	Precision, High Slew Rate Op Amp	MM2500
HA-2510	High Slew Rate Op Amp	MM2510
HA-2512	High Slew Rate Op Amp	MM2510
HA-2520	+3 Stable, High Slew Rate Op Amp	MM2520
HA-2522	+3 Stable, High Slew Rate Op Amp	MM2520
HA-2539	Very High Slew Rate, Wideband, +10 Stable Op Amp	MM2539
HA-2540	Wideband, Fast Settling, +10 Stable Op Amp	MM2540
HA-2541	Wideband, Fast Settling, Unity Gain Stable Op Amp	MM2541
HA-2542	Wideband, High Slew Rate, High Output Current, +2 Stable Op Amp	MM2542
HA-2544	Precision, High Slew Rate, Unity Gain Stable Op Amp	MM2544
HA-2548	Precision, High Slew Rate, Wideband, +5 Stable Op Amp	MM2548
HA-2600	Wideband, High Input Impedance Op Amp	MM2600
HA-2602	Wideband, High Input Impedance Op Amp	MM2600
HA-2620	Very Wideband, Uncompensated, +5 Stable Op Amp	MM2620
HA-2622	Very Wideband, Uncompensated, +5 Stable Op Amp	MM2620
HA-2839	Very High Slew Rate, Wideband, +10 Stable Op Amp	MM2839
HA-2840	Very High Slew Rate, Wideband, +10 Stable Op Amp	MM2840
HA-2841	Wideband, Fast Settling, Unity Gain Stable, Video Op Amp	MM2841
HA-2842	Wideband, High Slew Rate, High Drive, Video, +2 Stable Op Amp	MM2842
HA-2850	Low Power, High Slew Rate, Wideband, +10 Stable Op Amp	MM2850
HA4741	Quad, 3.5MHz General Purpose Op Amp	MM4741
HA-5002	Wideband, High Slew Rate Buffer	MM5002

PART NUMBER	DESCRIPTION	RELATED LITERATURE
HA-5004	100MHz Current Feedback Video Amplifier	MM5004
HA5013	Triple, 125MHz Current Feedback Video Amplifier	MM5013
HA-5020	100MHz Current Feedback Video Amplifier with Output Disable Function	MM5020
HA5022	Dual, 125MHz Current Feedback Video Amplifier, with Output Disable Function	MM5022
HA5023	Dual, 125MHz Current Feedback Video Amplifier	MM5023
HA5024	Quad, 125MHz Current Feedback Video Amplifier, with Output Disable Function	MM5024
HA5025	Quad, 125MHz Current Feedback Video Amplifier	MM5025
HA-5033	Video Buffer	MM5033
HA-5101	Low Noise, High Performance Op Amp	MM5101
HA-5102	Dual, Low Noise, High Performance Op Amp	MM5102
HA-5104	Quad, Low Noise, High Performance Op Amp	MM5104
HA-5112	Dual, Low Noise, High Performance, +10 Stable Op Amp	MM5112
HA-5114	Quad, Low Noise, High Performance, +10 Stable Op Amp	MM5114
HA-5127	Low Noise, Precision, Unity Gain Stable Op Amp	MM5127
HA-5137	Low Noise, Precision, +5 Stable Op Amp	MM5137
HA-5147	Low Noise, Precision, +10 Stable Op Amp	MM5147
HA-5190	Wideband, Fast-settling, +5 Stable Op Amp	MM5190
HA-5221	Low Noise, Wideband, Precision Op Amp	MM5221
HA-5222	Dual, Low Noise, Wideband, Precision Op Amp	MM5221
HFA1100 (Note)	850MHz Current Feedback Amplifier	N/A
HFA1109	450MHz Current Feedback Amplifier	MM1109
HFA1149	450MHz Current Feedback Amplifier with Programmable Output Disable Function	MM1149
HFA3046, HFA3096, HFA3127, HFA3128	8GHz NPN, 5.5GHz PNP Arrays	MM3046

NOTE: Macromodel is available but Application Note does not exist.

Linear Package Selection Guide

Using the Selection Guide:

The first character of each entry indicates the package type, while the number preceding the decimal point details the package lead count. Except for Can packages, the decimal point and succeeding numbers specify the package width in inches (e.g. __.15 = 150 mil width).

PART NUMBER	PDIP	SOIC, SSOP, TSSOP, PSOP	PLCC	CERDIP (F), SIDEBRAZE (D)	QUAD FLATPACK	CAN	SOT
CA124	E14.3	M14.15	-	-	-	-	-
CA1391	E8.3	-	-	-	-	-	-
CA1394	E8.3	-	-	-	-	-	-
CA139	E14.3	M14.15	-	F14.3	-	-	-
CA1458	E8.3	-	-	-	-	T8.C	-
CA1558	E8.3	-	-	-	-	T8.C	-
CA158	E8.3	M8.15	-	-	-	T8.C	-
CA224	E14.3	M14.15	-	-	-	-	-
CA239	E14.3	M14.15	-	F14.3	-	-	-
CA258	E8.3	M8.15	-	-	-	T8.C	-
CA2904	E8.3	M8.15	-	-	-	-	-
CA3018	-	-	-	-	-	T12.B	-
CA3020	-	-	-	-	-	T12.B	-
CA3028A, B	E8.3	M8.15	-	-	-	T8.C	-
CA3039	-	M14.15	-	-	-	T12.B	-
CA3045	-	-	-	F14.3, D14.3	-	-	-
CA3046	E14.3	M14.15	-	-	-	-	-
CA3049	-	-	-	-	-	T12.B	-
CA3053	E8.3	-	-	-	-	T8.C	-
CA3054	E14.3	M14.15	-	-	-	-	-
CA3060	E16.3	-	-	-	-	-	-
CA3078	E8.3	M8.15	-	-	-	T8.C	-
CA3080	E8.3	M8.15	-	-	-	T8.C	-
CA3081	E16.3	M16.15	-	F16.3	-	-	-
CA3082	E16.3	M16.15	-	F16.3	-	-	-
CA3083	E16.3	M16.15	-	F16.3	-	-	-
CA3086	E14.3	M14.15	-	F14.3	-	-	-
CA3089	E16.3	M20.3	-	-	-	-	-
CA3094	E8.3	M8.15	-	-	-	T8.C	-
CA3096	E16.3	M16.15	-	-	-	-	-
CA3098	E8.3	-	-	-	-	-	-
CA3100	E8.3	M8.15	-	-	-	T8.C	-

EXAMPLE: **M 16 .15**

Package information is available in Section 16.

PART NUMBER	PDIP	SOIC, SSOP, TSSOP, PSOP	PLCC	CERDIP (F), SIDEBRAZE (D)	QUAD FLATPACK	CAN	SOT
CA3102	E14.3	M14.15	-	-	-	-	-
CA3126	E16.3	M20.3	-	-	-	-	-
CA3127	E16.3	M16.15	-	-	-	-	-
CA3130	E8.3	M8.15	-	-	-	T8.C	-
CA3140	E8.3	M8.15	-	-	-	T8.C	-
CA3141	E16.3	-	-	-	-	-	-
CA3146	E14.3	M14.15	-	-	-	-	-
CA3160	E8.3	-	-	-	-	T8.C	-
CA3183	E16.3	M16.15	-	-	-	-	-
CA3189	E16.3	-	-	-	-	-	-
CA3193	E8.3	-	-	-	-	T8.C	-
CA3227	E16.3	M16.15	-	-	-	-	-
CA324	E14.3	M14.15	-	-	-	-	-
CA3240	E8.3, E14.3	-	-	-	-	-	-
CA3246	E14.3	M14.15	-	-	-	-	-
CA3256	E18.3	M20.3	-	-	-	-	-
CA3260	E8.3	-	-	-	-	T8.C	-
CA3280	E16.3	-	-	F16.3	-	-	-
CA3290	E8.3, E14.3	-	-	-	-	T8.C	-
CA339	E14.3	M14.15	-	-	-	-	-
CA3420	E8.3	-	-	-	-	T8.C	-
CA3440	E8.3	M8.15	-	-	-	-	-
CA3450	E16.3	-	-	-	-	-	-
CA358	E8.3	M8.15	-	-	-	T8.C	-
CA5130	E8.3	M8.15	-	-	-	T8.C	-
CA5160	E8.3	M8.15	-	-	-	T8.C	-
CA5260	E8.3	M8.15	-	-	-	-	-
CA5420	E8.3	M8.15	-	-	-	T8.C	-
CA5470	E14.3	M14.15	-	-	-	-	-
CA555	E8.3	M8.15	-	-	-	T8.C	-
CA741	E8.3	-	-	-	-	T8.C	-
HA-2400	-	-	-	F16.3	-	-	-
HA-2404	-	-	-	F16.3	-	-	-
HA-2405	E16.3	-	-	F16.3	-	-	-
HA-2406	E16.3	M16.3	-	F16.3	-	-	-
HA-2420	-	-	-	F14.3	-	-	-

EXAMPLE: M 16 .15

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

Linear Package Selection Guide

PART NUMBER	PDIP	SOIC, SSOP, TSSOP, PSOP	PLCC	CERDIP (F), SIDEBRAZE (D)	QUAD FLATPACK	CAN	SOT
HA-2425	E14.3	M14.15	N20.35	F14.3	-	-	-
HA-2444	E16.3	M16.3	-	-	-	-	-
HA-2500	-	-	-	F8.3A	-	T8.C	-
HA-2502	-	-	-	F8.3A	-	T8.C	-
HA-2505	E8.3	-	-	F8.3A	-	T8.C	-
HA-2510	-	-	-	F8.3A	-	T8.C	-
HA-2512	-	-	-	F8.3A	-	T8.C	-
HA-2515	E8.3	-	-	F8.3A	-	T8.C	-
HA-2520	-	-	-	F8.3A	-	T8.C	-
HA-2522	-	-	-	F8.3A	-	T8.C	-
HA-2525	E8.3	M8.15	N20.35	F8.3A	-	T8.C	-
HA-2529	E8.3	M8.15	-	F8.3A	-	T8.C	-
HA-2539	E14.3	M14.15	-	F14.3	-	-	-
HA-2540	E14.3	M14.15	-	F14.3	-	-	-
HA-2541	-	-	-	F14.3	-	T12.C	-
HA-2542	E14.3	-	-	F14.3	-	T12.C	-
HA-2544	E8.3	M8.15	-	F8.3A	-	T8.C	-
HA-2546	E16.3	M16.3	-	F16.3	-	-	-
HA-2547	-	-	-	F16.3	-	-	-
HA-2548	E8.3	M16.3	-	D8.3	-	T8.C	-
HA-2556	E16.3	M16.3	-	F16.3	-	-	-
HA-2557	E16.3	M16.3	-	F16.3	-	-	-
HA-2600	-	-	-	F8.3A	-	T8.C	-
HA-2602	-	-	-	F8.3A	-	T8.C	-
HA-2605	E8.3	M8.15	-	F8.3A	-	T8.C	-
HA-2620	-	-	-	F8.3A	-	T8.C	-
HA-2622	-	-	-	F8.3A	-	T8.C	-
HA-2625	E8.3	M8.15	-	F8.3A	-	T8.C	-
HA-2640	-	-	-	F8.3A	-	T8.C	-
HA-2645	-	-	-	F8.3A	-	T8.C	-
HA-2839	E14.3	-	-	F14.3	-	-	-
HA-2840	E8.3, E14.3	M8.15	-	F14.3	-	-	-
HA-2841	E8.3, E14.3	M8.15	-	-	-	-	-
HA-2842	E8.3, E14.3	M8.15	-	-	-	-	-
HA-2850	E8.3, E14.3	M8.15	-	F14.3	-	-	-
HA4201	E8.3	M8.15	-	-	-	-	-

EXAMPLE: **M 16 .15**

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

PART NUMBER	PDIP	SOIC, SSOP, TSSOP, PSOP	PLCC	CERDIP (F), SIDEBRAZE (D)	QUAD FLATPACK	CAN	SOT
HA4244	-	M8.15	-	-	-	-	-
HA4314B	E14.3	M14.15	-	-	-	-	-
HA4344B	E16.3	M16.15	-	-	-	-	-
HA4404B	E16.3	M16.15	-	-	-	-	-
HA456	-	-	N44.65	-	Q44.10x10	-	-
HA4600	E8.3	M8.15	-	-	-	-	-
HA-4741	E14.3	M16.3	-	F14.3	-	-	-
HA-4900	-	-	-	F16.3	-	-	-
HA-4902	E16.3	M16.3	N20.35	F16.3	-	-	-
HA-4905	E16.3	M16.3	N20.35	F16.3	-	-	-
HA-5002	E8.3	M8.15	N20.35	F8.3A	-	T8.C	-
HA-5004	-	-	-	F14.3	-	-	-
HA5013	E14.3	M14.15	-	-	-	-	-
HA-5020	E8.3	M8.15	-	F8.3A	-	-	-
HA5022	E16.3	M16.15	-	-	-	-	-
HA5023	E8.3	M8.15	-	-	-	-	-
HA5024	E20.3	M20.3	-	-	-	-	-
HA5025	E14.3	M14.15	-	-	-	-	-
HA-5033	E8.3	M8.15A	N20.35	-	-	T12.C	-
HA-5101	E8.3	M8.15	-	F8.3A	-	T8.C	-
HA-5102	E8.3	M16.3	-	F8.3A	-	T8.C	-
HA-5104	E14.3	M16.3	-	F14.3	-	-	-
HA-5111	E8.3	M8.15	-	F8.3A	-	-	-
HA-5112	E8.3	M16.3	-	F8.3A	-	-	-
HA-5114	E14.3	M16.3	-	F14.3	-	-	-
HA-5127	E8.3	M8.15	-	F8.3A	-	T8.C	-
HA-5130	-	-	-	F8.3A	-	T8.C	-
HA-5134	-	-	-	F14.3	-	-	-
HA-5135	-	-	-	F8.3A	-	T8.C	-
HA-5137	E8.3	M8.15	-	F8.3A	-	T8.C	-
HA-5142	E8.3	M16.3	-	F8.3A	-	T8.C	-
HA-5144	E14.3	M16.3	-	F14.3	-	-	-
HA-5147	E8.3	-	-	F8.3A	-	T8.C	-
HA-5160	-	-	-	-	-	T8.C	-
HA-5162	-	-	-	-	-	T8.C	-
HA-5170	-	-	-	F8.3A	-	T8.C	-

EXAMPLE: M 16 .15

- M — PACKAGE TYPE
- 16 — LEAD COUNT
- .15 — BODY WIDTH

Package information is available in Section 16.

Linear Package Selection Guide

PART NUMBER	PDIP	SOIC, SSOP, TSSOP, PSOP	PLCC	CERDIP (F), SIDEBRAZE (D)	QUAD FLATPACK	CAN	SOT
HA-5177	E8.3	-	-	F8.3A	-	-	-
HA-5190	-	-	-	F14.3	-	T12.C	-
HA-5195	-	M14.15	-	F14.3	-	T12.C	-
HA-5221	E8.3	M8.15	-	F8.3A	-	T8.C	-
HA-5222	E16.3	M16.3	-	F8.3A	-	-	-
HA-5320	E14.3	M16.3	-	F14.3	-	-	-
HA-5330	E14.3	-	-	F14.3	-	-	-
HA-5340	E14.3	M16.3	-	F14.3	-	-	-
HA5351	E8.3	M8.15	-	-	-	-	-
HA7210	E8.3	M8.15	-	-	-	-	-
HA7211	-	M8.15	-	-	-	-	-
HFA1100	E8.3	M8.15	-	F8.3A	-	-	-
HFA1102	E8.3	M8.15	-	F8.3A	-	-	-
HFA1103	E8.3	M8.15	-	-	-	-	-
HFA1105	E8.3	M8.15	-	-	-	-	-
HFA1106	E8.3	M8.15	-	-	-	-	-
HFA1109	E8.3	M8.15	-	-	-	-	-
HFA1110	E8.3	M8.15	-	F8.3A	-	-	-
HFA1112	E8.3	M8.15	-	F8.3A	-	-	-
HFA1113	E8.3	M8.15	-	F8.3A	-	-	-
HFA1114	E8.3	M8.15	-	-	-	-	-
HFA1115	E8.3	M8.15		-	-	-	-
HFA1120	E8.3	M8.15	-	F8.3A	-	-	-
HFA1130	E8.3	M8.15	-	F8.3A	-	-	-
HFA1135	E8.3	M8.15	-	-	-	-	-
HFA1145	E8.3	M8.15	-	-	-	-	-
HFA1149	E8.3	M8.15	-	-	-	-	-
HFA1205	E8.3	M8.15	-	-	-	-	-
HFA1212	E8.3	M8.15	-	-	-	-	-
HFA1245	E14.3	M14.15	-	-	-	-	-
HFA1405	E14.3	M14.15	-	-	-	-	-
HFA1412	E14.3	M14.15	-	-	-	-	-
HFA3046	-	M14.15	-	-	-	-	-
HFA3096	-	M16.15	-	-	-	-	-
HFA3101	-	M8.15	-	-	-	-	-
HFA3102	-	M14.15	-	-	-	-	-

EXAMPLE: **M 16 .15**

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

PART NUMBER	PDIP	SOIC, SSOP, TSSOP, PSOP	PLCC	CERDIP (F), SIDEBRAZE (D)	QUAD FLATPACK	CAN	SOT
HFA3127	-	M16.15	-	-	-	-	-
HFA3128	-	M16.15	-	-	-	-	-
HFA3134	-	-	-	-	-	-	P6.064
HFA3135	-	-	-	-	-	-	P6.064
HFA3524	-	M20.173	-	-	-	-	-
HFA3600	-	M14.15	-	-	-	-	-
HFA3624	-	M28.15	-	-	-	-	-
HFA3724	-	-	-	-	Q80.14x14	-	-
HFA3924	-	M28.209	-	-	-	-	-
HFA5253	-	M20.3A	-	-	-	-	-
ICL7611	E8.3	M8.15	-	-	-	T8.C	-
ICL7612	E8.3	M8.15	-	-	-	T8.C	-
ICL7621	E8.3	M8.15	-	-	-	T8.C	-
ICL7641	E14.3	-	-	-	-	-	-
ICL7642	E14.3	-	-	F14.3	-	-	-
ICL7650S	E8.3, E14.3	M8.15, M14.15	-	F14.3	-	T8.C	-
ICL8013	-	-	-	-	-	T10.B	-
ICL8038	E14.3	-	-	F14.3	-	-	-
ICM7242	E8.3	M8.15	-	-	-	-	-
ICM7555	E8.3	M8.15	-	-	-	T8.C	-
ICM7556	E14.3	-	-	F14.3	-	-	-
LM1458	E8.3	-	-	-	-	-	-
LM2901	E14.3	M14.15	-	-	-	-	-
LM2902	E14.3	M14.15	-	-	-	-	-
LM2904	E8.3	-	-	-	-	-	-
LM324	E14.3	-	-	-	-	-	-
LM3302	E14.3	M14.15	-	-	-	-	-
LM339	E14.3	-	-	-	-	-	-
LM358	E8.3	-	-	-	-	-	-
LM555	E8.3	-	-	-	-	-	-
LM741	E8.3	-	-	-	-	T8.C	-

EXAMPLE: M 16 .15

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

Check our world wide web site for the most current documentation.

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Data Acquisition Ordering Information

AD TYPES

ADC0803LC **WM** **-T**

PART NUMBER
Converters
AD, ADC

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Frit-Seal (CERDIP)
or Ceramic Dual-In-Line Metal Seal (SBDIP)
H: TO-52 Can
N: Dual-In-Line Plastic (PDIP)
WM: Small Outline Plastic (SOIC)

SUFFIX
-T: Tape and Reel

CA TYPES

CA3260 **A** **T** **3**

PART NUMBER
CAXXXX

ELECTRICAL OPTIONS
A, B, C, Blank

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
E: Dual-In-Line Plastic (PDIP)
F: Ceramic Dual-In-Line Frit-Seal(CERDIP)
J: Ceramic Leadless Chip Carrier (CLCC)
M: Small Outline Plastic (SOIC)
Q: Plastic Leaded Chip Carrier (PLCC)
S: DIL Formed TO-5
T: Can
Z: Single-In-Line Plastic (SIP)
Blank: Refer to Data Sheet for Package Type

SUFFIX
3: -55°C to 125°C
Modified Class B
3W: Modified Class B
without High & Low
Temperature DC
96: Tape and Reel

NOTE: If the part number contains three digits, add a leading zero when ordering. Example: CA555 becomes CA0555.

DG TYPES

DG **XXXX** **X** **X** **/883**

DEVICE FAMILY PREFIX
Switches and MUXs

PART NUMBER

TEMPERATURE RANGE
A: -55°C to 125°C
B: 25°C to 85°C
C: 0°C to 70°C
D: -40°C to 85°C
E: -40°C to 85°C Extended Process Flow with
Burn-In and 100% Temp Testing.

HIGH RELIABILITY DESIGNATOR
/883: Fully Compliant to MIL-STD-883
Class B/QML
/883B

PACKAGE DESIGNATOR
A: Can
J: Dual-In-Line Plastic (PDIP)
K: Ceramic Dual-In-Line Frit-Seal (CERDIP)
P: Ceramic Dual-In-Line Metal Seal (SBDIP)
Y: Small Outline Plastic (SOIC)
Y-T: Tape and Reel

HX "OLD" TYPES

H A 1 - 5134 -2

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
D: Digital
I: Interface
M: Memory
V: Analog High Voltage

PACKAGE DESIGNATOR
1: Ceramic Dual-In-Line Frit-Seal (CERDIP)
1B: Ceramic Dual-In-Line Metal-Seal (SBDIP)
2: Can
3: Dual-In-Line Plastic (PDIP)
4: Ceramic Leadless Chip Carriers (CLCC)
4P: Plastic Leaded Chip Carrier (PLCC)
6: Narrow Dual-In-Line Plastic (PDIP) or Ceramic Dual-In-Line Frit-Seal (CERDIP)
7: 8 Lead Ceramic Dual-In-Line Frit-Seal (CERDIP)
9P: Small Outline Plastic (SOIC)
0: Chip

NOTE: If the package designator is 2 characters the hyphen is omitted from the part number.

PART NUMBER

PERFORMANCE GRADE
A, B: High Performance
C: Relaxed Specification
S: Very High Speed

NOTE: Applies to HA, HD and HM products only.

SUFFIX
96: Tape and Reel Option for SOIC, PLCC
X96: Tape and Reel Option for SOIC, PLCC

TEMPERATURE GRADE
-2: -55°C to 125°C
-4: -25°C to 85°C
-5: 0°C to 75°C
-6: 25°C Chip Probe
-7: Dash-7 High Reliability Commercial Product 0°C to 75°C, includes 96 hour Burn-In
-8: -55°C to 125°C Harris Class B Equivalent Devices for use in Military and Flight Systems
-9: -40°C to 85°C
/883: Fully Compliant to MIL-STD-883, Class B/QML
BXXXX: Customer Specific Screening
RXXXX: Customer Specific Screening
SXXXX: Customer Specific Screening

HX, HXX "NEW" TYPES

H A 4314B C B 96

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
FA: Ultra-High Frequency Analog
I: Data Acquisition
IN: Interface
V: Analog High Voltage

PART NUMBER

TEMPERATURE
C: 0°C to 70°C
I: -40°C to 85°C
M: -55°C to 125°C

PACKAGE DESIGNATOR
A: Shrink Small Outline Plastic (SSOP)
B: Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
H: Plastic Small Outline Transistor (SOT)
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
L: Ceramic Leadless Chip Carrier (CLCC)
M: Plastic Leaded Chip Carrier (PLCC)
N: Thin Quad Flatpack (TQFP), or Metric Quad Flatpack (MQFP)
Q: Metric Plastic Quad Flatpack (MQFP), or Plastic Quad Flatpack (PQFP)
P: Dual-In-Line Plastic (PDIP)
T: Can
Y: Chip (Commercial Visual)
W: Wafer

SUFFIX
/883: Fully Compliant to MIL-STD-883 Class B/QML
96: Tape and Reel
-T: Tape and Reel

ICL, ICM TYPES

ICL 8069D C B A T

DEVICE FAMILY
ICL
ICM

PART NUMBER

TEMPERATURE RANGE
C: Commercial, 0°C to 70°C
I: Industrial, -25°C to 85°C or -40°C to 85°C (Specified on Data Sheet)
M: Military, -55°C to 125°C

PACKAGE DESIGNATOR
B: Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
F: Ceramic Flatpack
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
M: Metric Plastic Quad Flatpack (MQFP)
P: Plastic Dual-In-Line
S: TO-52 Can
T: Can (TO-99, TO-100)
Z: TO-92 (Plastic)
/W: Wafer
/D: Chip

SUFFIX
/883B: Fully Compliant to MIL-STD-883 Class B/QML
T: Tape and Reel

PIN COUNT DESIGNATOR

SUFFIX	PIN COUNT	DIAMETER
A	8	
B	10	
C	12	
D	14	
E	16	
F	22	
G	24	
H	42	
I	28	
J	32	
K	35	
L	40	
N	18	
P	20	
Q	2	
R	3	
V	8	0.200″ pin circle, isolated case
W	10	0.230″ pin circle, isolated case
X	10	0.230″ pin circle, case to pin 5
Y	8	0.200″ pin circle, case to pin 4
Z	8	0.230″ pin circle, case to pin 5
44	44	

IH TYPES

IH 5043 M J E /883B

DEVICE FAMILY
Interface

PART NUMBER

TEMPERATURE RANGE
C: Commercial, 0°C to 70°C
I: Industrial, -40°C to 85°C
M: Military, -55°C to 125°C

PACKAGE DESIGNATOR
B: Small Outline Plastic (SOIC)
Y: Narrow Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
P: Dual-In-Line Plastic (PDIP)
T: Can

SUFFIX
/883B: -55°C to 125°C Fully Compliant to MIL-STD-883, Class B/QML
/HR: -55°C to 125°C, Non-Compliant
/BI: With Burn-In
T: Tape and Reel

PIN COUNT DESIGNATOR
A: 8
D: 14
E: 16
P: 20
W: 10 (0.230" pin circle isolated case)

Data Acquisition Selection Trees

RS-232 INTERFACE FAMILY

HIN230 - HIN241 FAMILY BASED ON ICL232

HIN240 1µF Capacitor

HIN230 +5V 5D/0R
HIN231 +5V/+12V 2D/2R
HIN232 +5V/ 2D/2R
HIN233 +5V/ 2D/2R No Caps
HIN234 +5V 4D/0R
HIN235 +5V 5D/5R No Caps
HIN236 +5V 4D/3R
HIN237 +5V 5D/3R
HIN238 +5V 4D/4R
HIN239 +5V/+12V 4D/3R
HIN241 +5V 4D/5R

230.4 Kbps 1µF Capacitor

HIN232 +5V 2D/2R
HIN233 +5V 2D/2R No Caps

HIN200 0.1µF Capacitor

HIN200 +5V 5D/0R
HIN201 +5V/+12V 5D/0R
HIN202 +5V 2D/2R
HIN203 +5V 2D/2R No Caps
HIN204 +5V 4D/0R
HIN205 +5V 5D/5R No Caps
HIN206 +5V 4D/3R
HIN207 +5V 5D/3R
HIN208 +5V 4D/4R
HIN209 +5V/+12V 4D/3R
HIN211 +5V 4D/5R
HIN213 +5V 4D/5R

15kV ESD 230.4 Kbps

HIN202E +5V 2D/2R
HIN203E +5V 2D/2R No Caps
HIN205E +5V 5D/5R No Caps
HIN206E +5V 4D/3R
HIN207E +5V 5D/3R
HIN208E +5V 4D/4R
HIN211E +5V 4D/5R
HIN213E +5V 4D/5R

A/D CONVERTERS

GENERAL PURPOSE

100 KSPS ≥ f_{CONV}

WITH T/H
- 12-BIT
  - HI5810 (100 KSPS)

WITHOUT T/H
- 12-BIT
  - HI774 (111 KSPS)

10 KSPS ≤ f_{CONV} < 40 KSPS

WITHOUT T/H
- 8-BIT
  - ADC0802 (10.3 KSPS)
  - ADC0803 (10.3 KSPS)
  - ADC0804 (10.3 KSPS)

40 KSPS ≤ f_{CONV} < 100 KSPS

WITH T/H
- 10-BIT
  - CA3310 (77 KSPS)
- 12-BIT
  - HI5810 (100 KSPS)
  - HI5812 (50 KSPS)
  - HI5813 (40 KSPS, 3V Supply)

WITHOUT T/H
- 12-BIT
  - HI574 (40 KSPS)
  - HI674 (67 KSPS)
  - ICL7109 (µP Compatible)

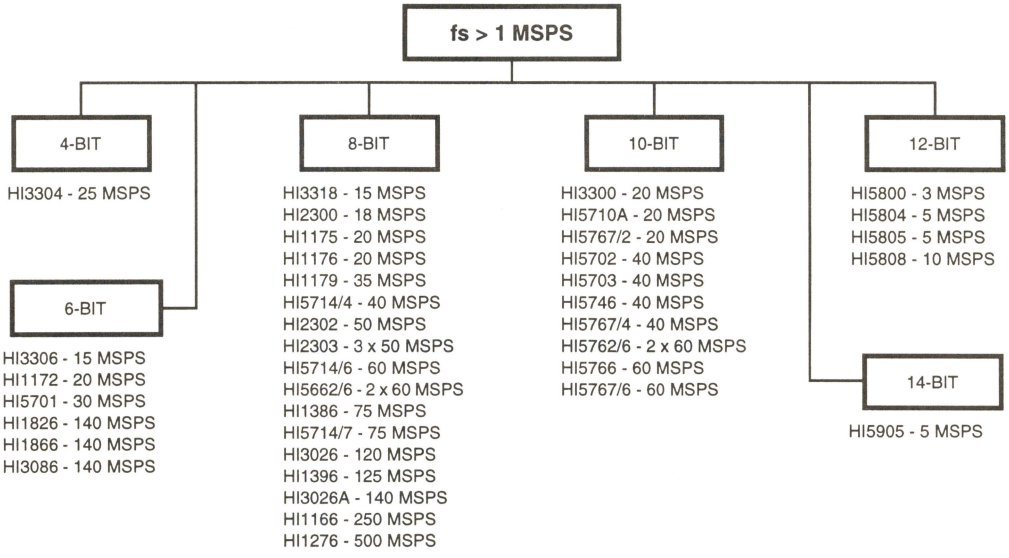
PRECISION

- 16-BIT 8 CHANNELS
  - HI7188 (ΣΔ)
- 24-BIT
  - HI7190 (ΣΔ)
  - HI7191 (ΣΔ)

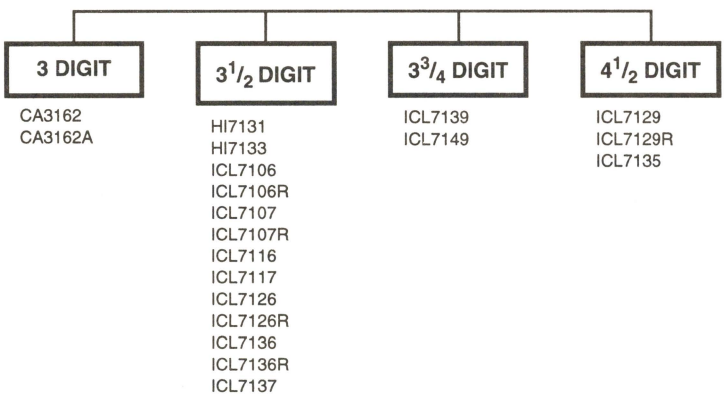
f_{CONV} < 10 KSPS

- 14-BIT
  - ICL8052/ICL7104
- 16-BIT
  - ICL8068/ICL7104
- $5\frac{1}{2}$ DIGIT
  - HI-7159A

HIGH SPEED A/D CONVERTERS

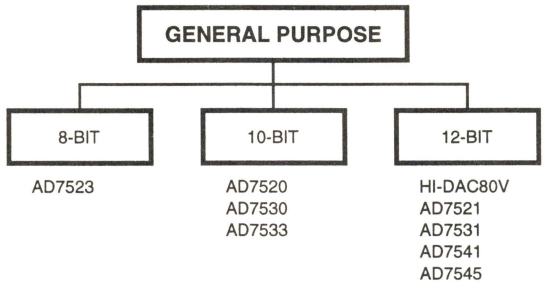


A/D CONVERTERS WITH DISPLAY OUTPUTS

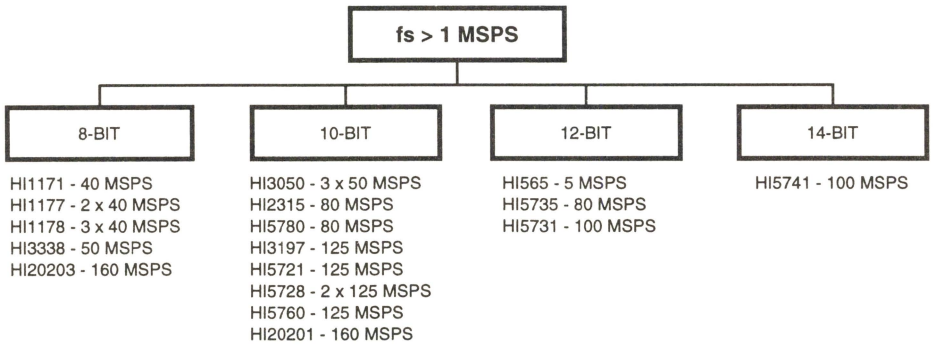


Data Acquisition Selection Trees

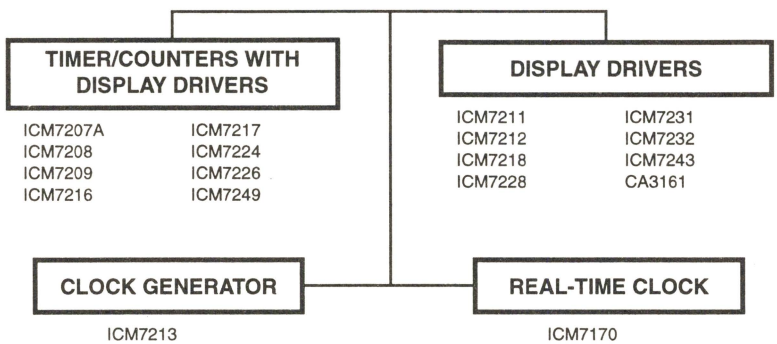
D/A CONVERTERS

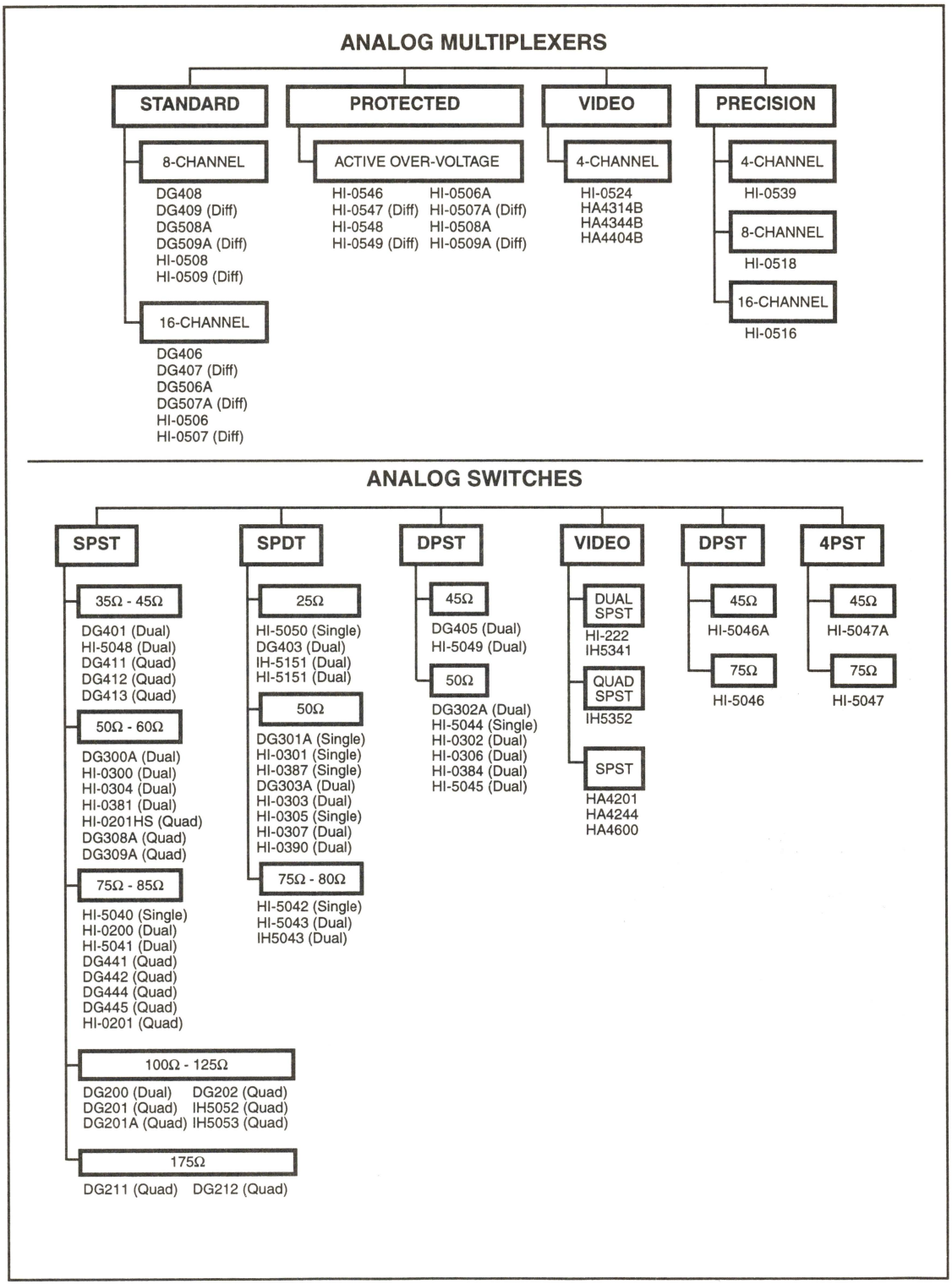


HIGH SPEED D/A CONVERTERS



CLOCKS/COUNTERS




ANALOG MULTIPLEXERS
STANDARD
8-CHANNEL
DG408
DG409 (Diff)
DG508A
DG509A (Diff)
HI-0508
HI-0509 (Diff)
16-CHANNEL
DG406
DG407 (Diff)
DG506A
DG507A (Diff)
HI-0506
HI-0507 (Diff)
PROTECTED
ACTIVE OVER-VOLTAGE
HI-0546
HI-0547 (Diff)
HI-0548
HI-0549 (Diff)
HI-0506A
HI-0507A (Diff)
HI-0508A
HI-0509A (Diff)
VIDEO
4-CHANNEL
HI-0524
HA4314B
HA4344B
HA4404B
PRECISION
4-CHANNEL
HI-0539
8-CHANNEL
HI-0518
16-CHANNEL
HI-0516
ANALOG SWITCHES
SPST
35Ω - 45Ω
DG401 (Dual)
HI-5048 (Dual)
DG411 (Quad)
DG412 (Quad)
DG413 (Quad)
50Ω - 60Ω
DG300A (Dual)
HI-0300 (Dual)
HI-0304 (Dual)
HI-0381 (Dual)
HI-0201HS (Quad)
DG308A (Quad)
DG309A (Quad)
75Ω - 85Ω
HI-5040 (Single)
HI-0200 (Dual)
HI-5041 (Dual)
DG441 (Quad)
DG442 (Quad)
DG444 (Quad)
DG445 (Quad)
HI-0201 (Quad)
100Ω - 125Ω
DG200 (Dual)
DG201 (Quad)
DG201A (Quad)
DG202 (Quad)
IH5052 (Quad)
IH5053 (Quad)
175Ω
DG211 (Quad)
DG212 (Quad)
SPDT
25Ω
HI-5050 (Single)
DG403 (Dual)
IH-5151 (Dual)
HI-5151 (Dual)
50Ω
DG301A (Single)
HI-0301 (Single)
HI-0387 (Single)
DG303A (Dual)
HI-0303 (Dual)
HI-0305 (Single)
HI-0307 (Dual)
HI-0390 (Dual)
75Ω - 80Ω
HI-5042 (Single)
HI-5043 (Dual)
IH5043 (Dual)
DPST
45Ω
DG405 (Dual)
HI-5049 (Dual)
50Ω
DG302A (Dual)
HI-5044 (Single)
HI-0302 (Dual)
HI-0306 (Dual)
HI-0384 (Dual)
HI-5045 (Dual)
VIDEO
DUAL SPST
HI-222
IH5341
QUAD SPST
IH5352
SPST
HA4201
HA4244
HA4600
DPST
45Ω
HI-5046A
75Ω
HI-5046
4PST
45Ω
HI-5047A
75Ω
HI-5047

Data Acquisition Evaluation Boards

PART NUMBER	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	DOCUMENT #
HI1166	HI1166-EV	HI1166, 8-Bit, 250 MSPS, Flash A/D Converter, Evaluation Platform	AN9328
HI1171	HI1171-EV	HI1171, 8-Bit, 40 MSPS D/A Converter, Evaluation Platform	AN9411
HI1175	HI1175-EV	HI1175, 8-Bit, 20 MSPS, A/D Converter, Evaluation Platform	AN9331
HI1176	HI1176-EV	HI1176, 8-Bit, 20 MSPS Video A/D Converter w/ DC Restore, Evaluation Platform	AN9407
HI1179	HI1179-EV	HI1179, 8-Bit, 35 MSPS, Video A/D Converter w/ DC Restore, Evaluation Platform	AN9407
HI20201	HI20201-EV	HI20201/HI20203, 10/8-Bit, 160 MSPS D/A Converter, Evaluation Platform	AN9406
HI20203	HI20201-EV	HI20201/HI20203, 10/8-Bit, 160 MSPS D/A Converter, Evaluation Platform	AN9406
HI3026	HI3026EVAL	HI3026, 8-Bit, 120 MSPS Flash A/D Converter Evaluation Platform	AN9652
HI3026A	HI3026AEVAL	HI3026A, 8-Bit, 140 MSPS Flash A/D Converter Evaluation Platform	AN9652
HI3086	HI3086EVAL	HI3086, 6-Bit, 140 MSPS Flash A/D Converter Evaluation Platform	-
HI5662	HI5662EVAL1	HI5662, Dual 8-Bit 60 MSPS A/D Converter, Evaluation Platform	-
HI-5701	HI5701-EV	HI5701, 6-Bit, 30 MSPS, Flash A/D Converter, Evaluation Platform	AN9216
HI5702	HI5703EVAL	HI5702, 10-Bit, 40 MSPS A/D Converter, Evaluation Platform	AN9534
HI5703	HI5703EVAL	HI5703, 10-Bit, 40 MSPS A/D Converter, Evaluation Platform	AN9534
HI5710A	HI5710EVAL	HI5710A, 10-Bit, 20 MSPS A/D Converter, Evaluation Platform	AN9511
HI5714	HI5714EVAL	HI5714, 8-Bit, 40/60/75 MSPS A/D Converter, Evaluation Platform	AN9517
HI5721	HI5721-EVP	HI5721, 10-Bit, 125 MSPS D/A Converter, PDIP, Evaluation Platform	AN9410
HI5721	HI5721-EVS	HI5721, 10-Bit, 125 MSPS D/A Converter, SOIC, Evaluation Platform	AN9410
HI5728	HI5728EVAL1	HI5728, Dual 10-Bit 125MHz D/A Converter, Evaluation Platform	-
HI5731	HI5731-EVS	HI5731, 12-Bit, 100MHz D/A Converter, SOIC, Evaluation Platform	AN9602
HI5741	HI5741-EVS	HI5741, 14-Bit, 100MHz DAC, SOIC, Evaluation Board	AN9626

Data Acquisition Evaluation Boards

PART NUMBER	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	DOCUMENT #
HI5746	HI5746EVAL1	HI5746, 10-Bit, 40 MSPS A/D Converter, Evaluation Platform	AN9725
HI5760	HI5760EVAL1	HI5760, 10-Bit 125MHz D/A Converter, Evaluation Platform	-
HI5762	HI5762EVAL1	HI5762, Dual 10-Bit 60 MSPS A/D Converter, Evaluation Platform	-
HI5766	HI5766EVAL1	HI5766, 10-Bit, 60 MSPS A/D Converter, Evaluation Platform	AN9726
HI5767	HI5767EVAL1	HI5767, 10-Bit, 20/40/60 MSPS A/D Converter, Evaluation Platform	-
HI5780	HI5780-EV	HI5780, 10-Bit, 80 MSPS D/A Converter, Evaluation Platform	AN9530
HI5800	HI5800-EV	HI5800, 12-Bit, 3 MSPS, Sampling A/D Converter, Evaluation Platform	AN9203
HI5804	HI5804EVAL	HI5804, 12-Bit, 5 MSPS A/D Converter. Evaluation Platform	AN9647
HI5805	HI5805EVAL1	HI5805, 12-Bit, 5 MSPS A/D Converter. Evaluation Platform	AN9707
HI5808	HI5808EVAL1	HI5808 12-Bit, 10 MSPS A/D Converter. Evaluation Platform	AN9724
HI5905	HI5905EVAL1	HI5905, 14-Bit, 5 MSPS A/D Converter. Evaluation Platform	AN9718
HI7188	HI7188EVAL	HI7188, 8-ch 16-Bit, Sigma Delta A/D Converter, Evaluation Platform	AN9518
HI7190	HI7190EVAL	HI7190, 24-Bit, Sigma Delta A/D Converter, Evaluation Platform	AN9505
HI7191	HI7190EVAL	HI7190, 24-Bit, Sigma Delta A/D Converter, Evaluation Platform	AN9505

RS-232 INTERFACE FAMILY

PART NO.	POWER SUPPLY	DRIVERS	RECEIVERS	SHUTDOWN	THREE-STATE	NO. OF PINS	KBITS/s	CAPS ON LEADFRAME
HIN200	+5V	5	0	Yes	No	20 Lead	120	No
HIN201	+5V/+12V	2	2	No	No	16 Lead	120	No
HIN202	+5V	2	2	No	No	16 Lead	120	No
HIN204	+5V	4	0	No	No	16 Lead	120	No
HIN206	+5V	4	3	Yes	Yes	24 Lead	120	No
HIN207	+5V	5	3	No	No	24 Lead	120	No
HIN208	+5V	4	4	No	No	24 Lead	120	No
HIN209	+5V/+12V	3	5	No	Yes	24 Lead	120	No
HIN211	+5V	4	5	Yes	Yes	28 Lead	120	No
HIN213	+5V	4	5	Yes	Yes	28 Lead	120	No
HIN230	+5V	5	0	Yes	No	20 Lead	120	No
HIN231	+5V/+12V	2	2	No	No	16 Lead	120	No
HIN232, ICL232	+5V	2	2	No	No	16 Lead	120	No
HIN234	+5V	4	0	No	No	16 Lead	120	No
HIN236	+5V	4	3	Yes	Yes	24 Lead	120	No
HIN237	+5V	5	3	No	No	24 Lead	120	No
HIN238	+5V	4	4	No	No	24 Lead	120	No
HIN239	+5V/+12V	3	5	No	Yes	24 Lead	120	No
HIN240	+5V	5	5	Yes	Yes	44 Lead	120	No
HIN241	+5V	4	5	Yes	Yes	28 Lead	120	No
15kV ESD-Protected, RS-232 Serial Port								
HIN202E	+5V	2	2	No	No	16 Lead	230	No
HIN203E	+5V	2	2	No	No	20 Lead	230	Yes
HIN205E	+5V	5	5	Yes	Yes	24 Lead	230	Yes
HIN207E	+5V	5	3	No	No	24 Lead	230	No
HIN208E	+5V	4	4	No	No	24 Lead	230	No
HIN211E	+5V	4	5	Yes	Yes	28 Lead	230	No
HIN213E	+5V	4	5	Yes	Yes	28 Lead	230	No
230K Bit/sec (.01µF) RS-232 Serial Port								
HIN232A	+5V	2	2	No	No	16 Lead	230	No
Caps on Leadframe RS-232 Serial Port								
HIN203	+5V	2	2	No	No	20 Lead	120	Yes
HIN205	+5V	5	5	Yes	Yes	24 Lead	120	Yes
HIN233	+5V	2	2	No	No	20 Lead	120	Yes
HIN235	+5V	5	5	Yes	Yes	24 Lead	120	Yes

ANALOG TO DIGITAL CONVERTERS - DISPLAY

(NOTES 2, 3) DEVICE	SUFFIX CODES	DISPLAY TYPE	DISPLAY DRIVE	CONVERSION TYPE	CONVERSION TIME (ms)	TECHNOLOGY	RANGE MIN	LINEARITY COUNTS	FEATURES
3 DIGIT WITH LED DRIVERS									
CA3162A	E	BCD	Common Anode (CA3161)	Integrating	10, 250	Bipolar-JI	+999mV to -99mV	±1	BCD to 7 Segment Converter, 2 Chip Set Makes a Complete DPM. Analog to Digital Converter, 3 Digit Output, "EEE": Positive Over-Range Indication, "-": Negative Over-Range Display.
CA3162	E	BCD	Common Anode (CA3161)	Integrating	10, 250	Bipolar-JI	+999mV to -99mV	±1	
$3^1/_2$ DIGIT WITH LED/LCD DRIVERS									
HI7131	CM44, CPL	LCD	Direct Drive	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	High Common Mode Front End No Over-Range Hangover
HI7133	CM44, CPL	LED	Common Anode	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	High Common Mode Front End No Over-Range Hangover
ICL7106	CM44, CPL	LCD	Direct Drive	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	
ICL7106R	CPL	LCD	Direct Drive	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	Reversed Leads
ICL7107	CM44, CPL	LED	Common Anode	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	
ICL7107R	CPL	LED	Common Anode	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	Reversed Leads
ICL7116	CM44, CPL	LCD	Direct Drive	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	ICL7106 with Display Hold Function
ICL7117	CPL	LCD	Direct Drive	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	ICL7107 with Display Hold Function
ICL7126	CPL	LCD	Direct Drive	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	Low Power Version of ICL7106
ICL7126R	CPL	LCD	Direct Drive	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	Low Power Version of ICL7106 Reversed Leads
ICL7136	CM44, CPL	LCD	Direct Drive	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	Low Power Version of ICL7106

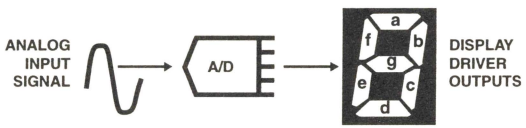
ANALOG TO DIGITAL CONVERTERS - DISPLAY (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	DISPLAY TYPE	DISPLAY DRIVE	CONVERSION TYPE	CONVERSION TIME (ms)	TECHNOLOGY	RANGE MIN	LINEARITY COUNTS	FEATURES
ICL7136R	CPL	LCD	Direct Drive	Auto-Zero Integrating	333 Typ	CMOS-JI	±0.2V	±1	Low Power Version of ICL7106 Reversed Leads
ICL7137	CPL	LED	Common Anode	Auto-Zero	333 Typ	CMOS-JI	±0.2V	±1	Low Power Version of ICL7107
$3^3/_4$ DIGIT WITH LCD DRIVERS									
ICL7139	CPL	LCD	Duplex	Auto Zero	400	CMOS-JI	±0.4V	±1	13 Ranges, Autoranging Multimeter, AC Internal
ICL7149	CM44, CPL	LCD	Duplex	Auto-Zero Integrating	400	CMOS-JI	±0.4V	±1	18 Ranges, Autoranging Multimeter, AC External
$4^1/_2$ DIGIT WITH LCD DRIVERS									
ICL7129	CM44, CPL	LCD	Triplexed	Auto-Zero Integrating	500	CMOS-JI	±0.2V	±1 Typ	10µV Resolution. 1X, 10X Range Selection
ICL7129R	CPL	LCD	Triplexed	Auto-Zero Integrating	500	CMOS-JI	±0.2V	±1 Typ	10µV Resolution. 1X, 10X Range Selection, PDIP Reversed Leads

ANALOG TO DIGITAL CONVERTERS WITH DISPLAY OUTPUTS (2 Chip Sets)

PART NUMBER	OUTPUT TYPE	RESOLUTION	CONVERSION TIME (SAMPLE RATE)	PACKAGE TYPES	FEATURES
CA3162	LED, CA, BCD	3 Digits	10ms/250ms (96SPS/4SPS)	16 Lead Plastic DIP	2 Chip Set Makes a Complete DPM A/D Converter, 3 Digit Output, "EEE": Positive Over-Range Indication, "-": Negative Over-Range Display
CA3161					
ICL7135	MUXED BCD	$4^1/_2$ Digits	250ms (4SPS)	28 Lead Plastic DIP	2 Chip Set 100µV Resolution, Differential Inputs
CA3161					

NOTE: Sorted by ascending resolution (Digits) and conversion time.



4-BIT HIGH SPEED A/D CONVERTER

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	INPUT FPBW (MHz)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI3304	JIP, JIB	Parallel, Binary, 4-Bit Latch, Three-State	Flash	25	40	CMOS, SOS	+3 to 7.5	2.0	±0.25	±0.25	IND	EXT	Low Power 25mW

6-BIT HIGH SPEED A/D CONVERTER

DEVICE	SUFFIX CODE	MIL SPEC	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	INPUT FPBW (MHz)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI3306	JIP/15, JIB/15	Y	Parallel, Binary, 6-Bit Latch, Three-State	Flash	15	30	CMOS, SOS	+3 to 7.5	4.8	±0.5	±0.5	IND	EXT	Low Power 70mW, Replaces Exar MP3306
	JIP/10, JIB/10	Y			10									
HI1172	JCP, JCB		TTL	2-Step	20	18	CMOS	+5		±0.5		COM	INT	Low Power 40mW
HI3-5701K	-5	Y	Parallel, Binary, 6-Bit Latch, Three-State	Flash	30	20	CMOS-JI	+5	4.0	±1.25	±0.6	COM	EXT	Low Cost MP7682 Second Source
HI9P5701K		Y											EXT	
HI3-5701B	-9	Y										IND	EXT	
HI9P5701B		Y											EXT	
HI1826	JCQ		ECL	Flash	140	250	ECL	-5.2	2.5			COM	EXT	
HI1866	JCQ		TTL/ECL		140	210	ECL	-	2.5			COM	EXT	1:2 De-Mux, TTL I/O
HI3086	JCQ		TTL/ECL		140	200	ECL	+5 or ±5	2.1	±0.5		COM	EXT	1:2 De-Mux, TTL I/O

8-BIT HIGH SPEED A/D CONVERTER

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	INPUT FPBW (MHz)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI3318	JIP, JIB	Parallel, Binary, 3-Bit Latch, Three-State	Flash	15	5	CMOS, SOS	+5	6.4	±1.5	+1.0, -0.8	IND		Low Power 8-Bit Flash
HI2300	JCQ	TTL	2-Step	18	18	CMOS	+3.3	1.5	±1.3	±0.5	COM	INT	Low Power 18mW, DC Restore
HI1175	JCB, JCP	Parallel, Binary, 8-Bit Latch, Three-State	2-Step	20	18	CMOS	+5	2	±1.3	±0.5	IND	INT	Low Power 60mW
HI1176	JCQ		2-Step	20	18 (0-1db)		+5	2	±1.3	±0.5	IND	INT	Low Power 60mW, DC Restore
HI1179	JCQ	Parallel, Binary, 8-Bit Latch, Three-State	2-Step	35	60	CMOS	+5	2	+1.3 -1.0	±0.5	IND	INT	Low Power 80mW, DC Restore
HI5714/4	CB	Parallel, Binary	2-Step Folding	40	15	HBC10	+5	2	±0.75	±0.5	COM	EXT	ENOB = 7.8 Bits at 4.43MHz

8-BIT HIGH SPEED A/D CONVERTER (Continued)

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	INPUT FPBW (MHz)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI2302	IQ	TTL	2-Step	50	100	CMOS		2	±0.5		COM	INT	Low Power 125mW, DC Restore
HI2303	JCQ	TTL	2-Step	3 x 50	100	CMOS	$+5V_A$ / $+3.3V_D$	2	±0.7	±0.3	IND	INT	Triple A/D, DC Restore
HI5714/6	CB	Parallel, Binary	2-Step Folding	60	15	HBC10	+5	2	±0.75	±0.5	COM	EXT	ENOB = 7.7 Bits at 4.43MHz
HI5662/6	IN	TTL	Pipeline	2 x 60	250	CMOS	$+5V_A$ / $+3V_D$	1	±1	±0.5	IND	EXT	Dual A/D
HI5714/7	CB	Parallel, Binary	2-Step Folding	75	15	HBC10	+5	2	±0.75	±0.5	COM	EXT	ENOB = 7.7 Bits at 4.43MHz
HI1386	JCP, AIL	Parallel, Binary, 8-Bit Latch	Flash	75	150	Bipolar	-5.2	2	±0.5	±0.5	IND, COM	EXT	Low Power 580mW
HI3026	JCQ	TTL, 1:2 Demux	Flash	120	150	Bipolar	+5 or ±5	2	±0.5	±0.5	COM	EXT	
HI1396	JCJ, AIL	Parallel, Binary, 8-Bit Latch	Flash	125	200	Bipolar	-5.2	2	±0.5	±0.5	IND, COM	EXT	Low Power 870mW
HI3026A	JCQ	TTL, 1:2 Demux	Flash	140	150	Bipolar	+5 or ±5	2	±0.5	±0.5	COM	EXT	
HI1166	AIL	Parallel, Binary, 8-Bit Latch	Flash	250	250	Bipolar	-5.2	2	±0.5	±0.5	IND	EXT	Low Power 1.4W
HI1276	AIL	Parallel, Binary, 8-Bit Latch	Flash	500	300	Bipolar	-5.2	2	±0.7	±0.5	IND	EXT	Low Power 2.8W

10-BIT HIGH SPEED A/D CONVERTER

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	INPUT FPBW (MHz)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI5710A	JCQ	Offset Binary, 2's Complement	2 Step Flash	20	100	CMOS	$+5V_A$ / $+3.3V_D$	2	±1.3	±0.5	COM	EXT	Low Power 150mW
HI5767/2	CB	Offset Binary, 2's Complement	Pipeline	20	250	CMOS	$+5V_A$ / $+3V_D$	1	±1.0	±0.5	COM	INT	
HI5702	JCB	Offset Binary, 2's Complement	Pipeline	36	250	BiCMOS	+5	1.25	±1.0	±0.5	COM	EXT	9+ ENOB at 10MHz Input
HI5702	KCB		Pipeline	40	250	BiCMOS	+5						
HI5703	KCB	Offset Binary, 2's Complement	Pipeline	40	250	BiCMOS	$+5V_A$ / $+3V_D$	1.25	±1.0	±0.5	COM	EXT	9+ ENOB at 10MHz Input
HI5746	KCB	Offset Binary, 2's Complement	Pipeline	40	250	CMOS	$+5V_A$ / $+3V_D$	1	±1.0	±0.5	COM	EXT	Low Power 225mW, 8.8 ENOB at 10MHz

10-BIT HIGH SPEED A/D CONVERTER (Continued)

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	INPUT FPBW (MHz)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI5767/4	CB	Offset Binary, 2's Complement	Pipeline	40	250	CMOS	$+5V_A$ / $+3V_D$	1	±1.0	±0.5	COM	INT	
HI5767/6	CB	Offset Binary, 2's Complement	Pipeline	60	250	CMOS	$+5V_A$ / $+3V_D$	1	±1.0	±0.5	COM	INT	
HI5766	KCB	Offset Binary, 2's Complement	Pipeline	60	250	CMOS	$+5V_A$ / $+3V_D$	1	±1.0	±0.5	COM	EXT	Low Power 315mW, 8.3 ENOB at 10MHz Input
HI5762/6	IN	Offset Binary, 2's Complement	Pipeline	2 x 60	250	CMOS	$+5V_A$ / $+3V_D$	1	±1.0	±0.5	COM	INT	Dual A/D

12-BIT HIGH SPEED A/D CONVERTER

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	INPUT FPBW (MHz)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI5800	BID, KCD	Parallel, Binary, Three-State, 8-Bit Bus,12-Bit Bus and 16-Bit Bus	Two-Step	3	20	BiCMOS	±5V	5	±1.0		COM, IND	INT	High Performance Sampling A/D System, +11.5 ENOB
HI5800	JCD						±5V		±2.0		COM,		
HI5804	KCB	Offset Binary	Pipeline	5	100	BiCMOS	$+5V_A$ / $+3V_D$	4	±2.0	±0.5	COM,	INT	10.3 ENOB at 1MHz Input, 300mW
HI5805	BIB			5		BiCMOS	$+5V_A$ / $+3V_D$	4	±1.0	±0.5	IND	INT	11 ENOB at 1MHz Input, 300mW
HI5808	BIB			10		BiCMOS	$+5V_A$ / $+3V_D$	4	±1.0	±0.5	IND	INT	10.8 ENOB at 1MHz Input, 325mW

14-BIT HIGH SPEED A/D CONVERTER

DEVICE	SUFFIX CODE	MIL SPEC	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	INPUT FPBW (MHz)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI5905	IN	Y	2's Complement	Pipeline	5	100	BiCMOS	+5V	4	±1.0	±0.5	IND	INT	350mW

8-BIT SUCCESSIVE APPROXIMATION A/D CONVERTER

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (KSPS)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
ADC0802	LCN	8-Bit Three-State	Successive Approximation	10	CMOS	+5	5	$\pm 1/2$	COM	EXT	80C48 and 80C80/85 Bus Compatible - No Interfacing Logic Required, Conversion Time <100µs, Easy Interface to Most Microprocessors, Will Operate in a "Stand Alone" Mode, Differential Analog Voltage Inputs, Works with Bandgap Voltage References, TTL Compatible Inputs and Outputs, On-Chip Clock Generator, 0V to 5V Analog Voltage Input Range (Single +5V Supply), No Zero-Adjust Required
ADC0802	LCD							$\pm 3/4$	IND		
ADC0802	LD							±1	MIL		
ADC0803	LCN							$\pm 1/2$	COM		
ADC0803	LCD							$\pm 3/4$	IND		
ADC0802	LCWM							±1	IND		
ADC0803	LD							±1	MIL		
ADC0804	LCN							±1	COM		
ADC0804	LCD							±1	IND		

10-BIT SUCCESSIVE APPROXIMATION A/D CONVERTER

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (KSPS)	INPUT FPBW (MHz)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
CA3310	E	10-Bit Microprocessor Compatible	Successive Approximation	77	1.5	CMOS	+3 to +6	ADJ	±0.75	±0.75	IND		CMOS Low Power (15mW Typ), Single Supply Voltage (3V to 6V), 13µs Conversion Time, Built-In Track and Hold, Rail-to-Rail Input Range, Latched Three-State Output Drivers, Microprocessor-Compatible Control Lines, Internal or External Clock
CA3310	AE								±0.5	±0.5	IND		
CA3310	M								±0.75	±0.75	IND		
CA3310	AM								±0.5	±0.5	IND		
CA3310	D								±0.75	±0.75	MIL		
CA3310	AD								±0.5	±0.5	MIL		

12-BIT SUCCESSIVE APPROXIMATION A/D CONVERTER

DEVICE	SUF-FIX CODE	MIL SPEC	OUTPUTS	CONV. TYPE	CONV. RATE (KSPS)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI5813	JIP, JIB, JIJ		12-Bit Latched Three-State	Successive Approximation	40	CMOS	+3.3	5	±4.0	±4.0	IND	EXT	3.3V Supply, 25µs Conversion, Same as HI5812
	KIP, KIB, KIJ								±2.5	±2.5	IND	EXT	

12-BIT SUCCESSIVE APPROXIMATION A/D CONVERTER (Continued)

DEVICE	SUF-FIX CODE	MIL SPEC	OUTPUTS	CONV. TYPE	CONV. RATE (KSPS)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI3-574AJN	-5		8, 12, or 16-Bit Three-State Digital Interface for Microprocessor Control	Successive Approximation	40	Bipolar	±12 or ±15	12	±1.0		COM	10	Complete 12-Bit A/D Converter with Reference and Clock, Full 8-, 12- or 16-Bit Microprocessor Bus Interface 150ns Bus Access Time, No Missing Codes Over Temperature, Minimal Setup Time for Control Signals, 25µs Max Conversion Times, Low Noise, via Current-Mode Signal Transmission Between Chips, Byte Enable/Short Cycle (A_0 Input), Guaranteed Break-Before-Make Action, Eliminating Bus Contention During Read Operation. Latched by Start Convert Input (To Set the Conversion Length), ±12V to ±15V Operation
HI3-574AKN	-5								±0.5		COM		
HI3-574ALN	-5								±0.5		COM		
HI1-574AJD	-5								±1.0		COM		
HI1-574AKD	-5								±0.5		COM		
HI1-574ALD	-5								±0.5		COM		
HI1-574ASD	-2	Y							±1.0		MIL		
HI1-574ATD	-2	Y							±0.5		MIL		
HI1-574AUD	-2	Y							±0.5		MIL		
HI5812	JIP, JIB, JIJ		12-Bit Latched Three-State	Successive Approximation	50	CMOS	+5	5	±1.5	±2.0	IND	EXT	20µs Conversion Time, 50 KSPS Throughput Rate, Built-In Track and Hold, Single +5V Supply Voltage, 25mW Maximum Power Consumption, Internal or External Clock
	KIP, KIB, KIJ								±1.0	±2.0	IND	EXT	
HI3-674AJN	-5		8, 12, or 16-Bit Three-State Digital Interface for Microprocessor Control	Successive Approximation	67	Bipolar	±12 or ±15	12	±1.0		COM	10	Complete 12-Bit A/D Converter with Reference and Clock, Full 8-, 12- or 16-Bit Microprocessor Bus Interface, 150ns Bus Access Time, No Missing Codes Over Temperature, Minimal Setup Time for Control Signals, 15µs Max Conversion Times, Low Noise, via Current-Mode Signal Transmission Between Chips, Byte Enable/Short Cycle (A_0 Input), Guaranteed Break-Before-Make Action, Eliminating Bus Contention During Read Operation. Latched by Start Convert Input (To Set the Conversion Length), ±12V to ±15V Operation
HI3-674AKN	-5								±0.5		COM		
HI3-674ALN	-5								±0.5		COM		
HI1-674AJD	-5								±1.0		COM		
HI1-674AKD	-5								±0.5		COM		
HI1-674ALD	-5								±0.5		COM		
HI1-674ASD	-2	Y							±1.0		MIL		
HI1-674ATD	-2	Y							±0.5		MIL		
HI1-674AUD	-2	Y							±0.5		MIL		
HI5810	JIP, JIB, JIJ		12-Bit Latched Three-State	Successive Approximation	100	CMOS	+5	5	±2.5	±2.0	IND	EXT	10µs Conversion Time, 100 KSPS Throughput Rate, Built-In Track and Hold, Single +5V Supply Voltage, 40mW Maximum Power Consumption, Internal or External Clock, 1MHz Input Bandwidth -3dB
	KIP, KIB, KIJ								±2.0	±2.0	IND	EXT	

12-BIT SUCCESSIVE APPROXIMATION A/D CONVERTER (Continued)

DEVICE	SUF-FIX CODE	MIL SPEC	OUTPUTS	CONV. TYPE	CONV. RATE (KSPS)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	DNL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI3-774J	-5		8, 12, or 16-Bit Three-State Digital Interface for Microprocessor Control	Successive Approximation	111	Bipolar	±12 or ±15	12	±1.0		COM	10	Complete 12-Bit A/D Converter with Reference and Clock, Full 8-, 12- or 16-Bit Microprocessor Bus Interface 150ns Bus Access Time, No Missing Codes Over Temperature, Minimal Setup Time for Control Signals, 9µs Max Conversion Times, Digital Error Correction (HI-774), Low Noise, via Current-Mode Signal Transmission Between Chips, Byte Enable/Short Cycle (A_O Input), Guaranteed Break-Before-Make Action, Eliminating Bus Contention During Read Operation. Latched by Start Convert Input (To Set the Conversion Length), ±12V to ±15V Operation
HI3-774K									±0.5		COM		
HI1-774J									±1.0		COM		
HI1-774K									±0.5		COM		
HI1-774T	-2								±0.5		MIL		
HI1-774U		Y							±0.5		MIL		

16-BIT, 8 CHANNEL SIGMA DELTA A/D SUBSYSTEM

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI7188	IP, IN	Serial QSPI, SP, I, Microwire	Sigma Delta 4th Order Modulator	240/Channel	BiCMOS	+5	±2.5V	(.0015)	IND	+2.5V	High Throughput 8-Channel Sigma Delta A/D On Board Micro-Sequencer

24-BIT SIGMA DELTA A/D CONVERTER

DEVICE	SUFFIX CODE	OUTPUTS	CONV. TYPE	CONV. RATE (MSPS)	TECH-NOLOGY	POWER SUPPLY (V)	INPUT RANGE (V)	INL (LSB)	TEMP. RANGE	V_{REF}	FEATURES
HI7190	IB, IP	Serial QSPI, SP, Microwire	Sigma Delta 2nd Order Modulator	11Hz -2kHz	BiCMOS	+5	±2.5V	(.0007)	IND	+2.5V	Low Noise Sigma Delta 23.5 Bit ENOB at 16 Bits Linear
HI7191											

8-BIT GENERAL PURPOSE D/A CONVERTERS

(NOTES 2, 3) DEVICE	SUFFIX CODES	INL (LSB)	DNL (LSB)	CONV. RATE	SETTLING TIME (µs)	TECH-NOLOGY	POWER SUPPLY (V)	MULTI-PLYING	OUTPUT I/V	INPUT BUFFER	TEMP. RANGE	V_{REF}	FEATURES
AD7523J	N	$\pm 1/2$	Monotonic	5	200 Max	CMOS-JI	+5V to +16V at 2.5mA (Excl I Ladder)	X	I	No	COM	External	Second Source, 3 Performance Grades, External Reference, Current Output
AD7523K		$\pm 1/4$											
AD7523L		$\pm 1/8$											

10-BIT GENERAL PURPOSE D/A CONVERTERS

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	INL (LSB)	CONV. RATE	SETTLING TIME (μs)	TECH-NOLOGY	POWER SUPPLY (V)	MULTI-PLYING	OUT-PUT I/V	INPUT BUFFER	TEMP. RANGE	V_{REF}	FEATURES
AD7520J	D		±2	2	500 Typ	CMOS-JI	+5V to +15V at 2mA (Excl I Ladder)	X	I	No	COM, MIL	External	Full Input Static Protection, Second Source, 3 Performance Grades, External Reference, Current Output
AD7520J	N		±2										
AD7520K	D		±1										
AD7520K	N		±1										
AD7520L	D		±1/2										
AD7520L	N		±1/2										
AD7520S	D	Y	±2										
AD7520T	D		±1										
AD7520U	D	Y	±1/2										
AD7530J	N		±2	2	500 Typ	CMOS-JI	+5V to +15V at 2mA (Excl I Ladder)	X	I	No	COM, MIL	External	Full Input Static Protection, Full Input Static Protection, Second Source, 3 Performance Grades, External Reference, Current Output
AD7530K			±1										
AD7530L			±1/2										
AD7533J	N		±2	1.25	800 Max	CMOS-JI	+5V to +15V at 2mA (Excl I Ladder)	X	I	No	COM	EXT	Full Input Static Protection, Second Source, Low Cost, External Reference, Current Output
AD7533K			±1										
AD7533L			±1/2										

12-BIT GENERAL PURPOSE D/A CONVERTERS

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	INL (LSB)	DNL (LSB)	CONV. RATE	SETTLING TIME (μs)	TECH-NOLOGY	POWER SUPPLY (V)	MULTI-PLYING	OUT-PUT I/V	INPUT BUFFER	TEMP. RANGE	V_{REF}	FEATURES
HI3-DAC80V	-5		±1/2	±3/4		1.5 Max	Bipolar			V	No		INT	Low Cost, Internal Op Amp
HI3-DAC85V	-4		±1/2	±1/2										
HI1-565AJD	-5	Y	±1/2	±3/4	5	0.5 Typ	Bipolar-DI	±15 at +12mA/ -15mA		I	No	COM, MIL	INT	Industry Standard, DI Process, Internal Reference, Current Output
HI1-565AKD		Y	±1/4	±1/2										
HI1-565ASD	-2		±1/2	±3/4										
HI1-565ATD			±1/4	±1/2										

12-BIT GENERAL PURPOSE D/A CONVERTERS (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	INL (LSB)	DNL (LSB)	CONV. RATE	SETTLING TIME (μs)	TECH-NOLOGY	POWER SUPPLY (V)	MULTI-PLYING	OUT-PUT I/V	INPUT BUFFER	TEMP. RANGE	V_{REF}	FEATURES
AD7521J	N		±8		2	0.5 Typ	CMOS-JI	+5V to +15V at 2mA (Excl I Ladder)	X	I	No	COM	EXT	12-Bit Versions of AD7520, AD7530
AD7521K			±4											
AD7521L			±2											
AD7531J	N		±8		2	0.5 Max	CMOS-JI	+5V to +15V at 2mA (Excl I Ladder)	X	I	No	COM	EXT	12-Bit Versions of AD7520, AD7530
AD7531K			±4											
AD7531L			±2											
AD7541J	N		±1		1	1.0 Max	CMOS-JI	+5V to +16V at 2mA (Excl I Ladder)	X	I	No	COM	EXT	Second Source, External Reference, Current Output
AD7541K			$\pm^1/_2$											
AD7541L			$\pm^1/_2$	Monotonic										
AD7545A	N		±2	±4.0	500	2.0 Max	CMOS-JI	+5V to +16V at 2mA (Excl I Ladder)	X	I	Yes	COM, MIL, IND	EXT	Second Source, External Reference, Current Output
AD7545B			±1	±1.0										
AD7545J			±2	±4.0										
AD7545K			±1	±1.0										

8-BIT HIGH SPEED D/A CONVERTERS

(NOTES 2, 3) DEVICE	SUFFIX CODES	INL (LSB)	DNL (LSB)	CONV. RATE (MHz)	SETTLING TIME (ns)	TECH-NOLOGY	POWER SUPPLY (V)	MULTI-PLYING	OUTPUT I/V	INPUT BUFFER	TEMP. RANGE	V_{REF}	FEATURES
HI3338	KIP, KIB	$\pm^3/_4$	$\pm^1/_2$	50	20	CMOS	+5		V	Yes	IND	EXT	8-Bit Video Speed, Low Glitch
HI1171	JCB	±1.3	$\pm^1/_4$	40	25	CMOS	+5		I	Yes	COM	EXT	8-Bit Video Speed, Low Glitch, Low Power, Low Cost, 40 MSPS
HI20203	JCB, JCP	±1	$\pm^1/_2$	160	4.3	Bipolar	-5.2	Yes	I	Yes	COM	EXT	8-Bit 160MHz D/A with ECL Inputs,Low Glitch, Low Power
HI1177	JCQ	±0.5	±0.3	2 x 40		CMOS	+5	NO	I	Yes	IND	EXT	2 Channels
HI1178	JCQ	±0.5	±0.3	3 x 40			+5	NO	I	Yes	IND	EXT	3 Channels

10-BIT HIGH SPEED D/A CONVERTERS

(NOTES 2, 3) DEVICE	SUFFIX CODES	INL (LSB)	DNL (LSB)	CONV. RATE (MHz)	SETTLING TIME (ns)	TECH-NOLOGY	POWER SUPPLY (V)	MULTI-PLYING	OUT-PUT I/V	INPUT BUFFER	TEMP. RANGE	V_{REF}	FEATURES
HI5721	BIB BIP	±0.5	±0.5	125	4.5	BiCMOS	+5 / -5.2	Yes	I	Yes	IND	INT	10-Bit, 125MHz, Low Glitch, Low Power, TTL/CMOS Inputs, High Speed DAC for Communications Applications
HI20201	JCB, JCP	±1	±1/2	160	5.2 Typ	Bipolar	-5.2	Yes	I	Yes	COM	EXT	10-Bit 160MHz D/A with ECL Inputs, Low Glitch, Low Power
HI3050	JCQ	±2	±1/2	3 x 50		CMOS	+5		I	Yes	COM	EXT	Triple DAC, 50MHz
HI2315	JCQ	±1.5	±0.5	80			+5	NO	I	Yes	COM		Low Glitch Video DAC
HI5780	JCQ	±2.0	±0.5	80	6.0		+5		I	Yes	COM		Low Power 150mW
HI3197	JCQ	±0.5	±1.0	125	3.5	Bipolar	+5 or ±5						Multiplexed Inputs
HI5760	BIB	±1	±0.5	125		CMOS	+5 or +3	Yes	I	Yes	IND	INT	Low Power
HI5728	IQ	±1	±0.5	2 x 125		CMOS	+5 or +3	Yes	I	Yes	IND	INT	2 Channel

12-BIT HIGH SPEED D/A CONVERTERS

(NOTES 2, 3) DEVICE	SUFFIX CODES	INL (LSB)	DNL (LSB)	CONV. RATE (MSPS)	SETTLING TIME (ns)	TECH-NOLOGY	POWER SUPPLY (V)	MULTI-PLYING	OUT-PUT I/V	INPUT BUFFER	TEMP. RANGE	V_{REF}	FEATURES
HI5731	BIB, BIP	1.5	±1.0	100	0.02	BiCMOS	5 and -5.2	Yes	I	Yes	IND	INT	Low Power, High Speed, Low Glitch, TTL/CMOS Input, High Speed DAC for Communications Applications
HI5735	KCP, KCB	1.5	±1.0	80	0.02	BiCMOS	5 and -5.2	Yes	I	Yes	COM	INT	Low Power, High Speed, TTL/CMOS Input, Low Glitch

14-BIT HIGH SPEED D/A CONVERTERS

(NOTES 2, 3) DEVICE	SUFFIX CODES	INL (LSB)	DNL (LSB)	CONV. RATE (MSPS)	SETTLING TIME (ns)	TECH-NOLOGY	POWER SUPPLY (V)	MULTI-PLYING	OUT-PUT I/V	INPUT BUFFER	TEMP. RANGE	V_{REF}	FEATURES
HI5741	BIB, BIP	1.5	±1.0	100	0.02	BiCMOS	5 and -5.2	Yes	I	Yes	IND	Internal	Low Power, High Speed, TTL/CMOS Input, Low Glitch, High Speed DAC for Communications Applications

SINGLE POLE SINGLE THROW SWITCH (SPST, FIGURE 1)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-5040	-2, -5, -7	Y	75	2.4	0.8	36V CMOS-DI	0.8	370	280	

DUAL SINGLE POLE SINGLE THROW SWITCH (2 x SPST, FIGURE 2)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG200	AA, AK BA, BK CJ	Y	100	2.4	0.8	36V CMOS-JI	2.0	1000	500	TTL Inputs
DG300A	CA, AA, AK BA, BK CK, CJ	Y	50	4.0	0.8	44V CMOS-JI	0.1	150	130	TTL/CMOS Inputs
DG401	DJ, DY, EJ, EY	Y	45	2.4	0.8	44V CMOS-JI	-0.01	100	60	Very Low $r_{DS(ON)}$
HI1-0200	-2, -4, -5, -7	Y	80	0.8	2.4	44V CMOS-DI	1.0	240	500 (-5) 330 (-2)	
HI2-0200	-2, -4, -5, -7	Y								
HI3-0200	-5									
HI9P0200	-5, -9									
HI-0222	-5, -9	Y	35	2.0	0.8	36V CMOS-DI	0.1	100	70	Video Switch
HI1-0222	-5, -9									
HI3-0222	-5									
HI4-0222		Y								
HI4P0222	-5									
HI1-0300	-2, -5	Y	50	4.0	0.8	44V CMOS-DI	0.04	210	160	TTL/5V CMOS Logic Very Low Leakage
HI2-0300	-2, -5	Y								
HI3-0300	-5									
HI9P0300	-5, -9									
HI1-0304	-2, -5	Y	50	11.0	3.5	44V CMOS-DI	0.04	160	100	15V CMOS Logic Very Low Leakage
HI2-0304	-2, -5	Y								
HI3-0304	-5									
HI9P0304	-5, -9									
HI1-0381	-2, -5	Y	50	4.0	0.8	44V CMOS-DI	0.04	210	160	Very Low Leakage
HI2-0381	-2, -5	Y								
HI3-0381	-5									
HI9P0381	-5, -9									

DUAL SINGLE POLE SINGLE THROW SWITCH (2 x SPST, FIGURE 2) (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-5041	-2, -5, -7, -8	Y	75	2.4	0.8	36V CMOS-DI	0.8	370	280	10Ω $r_{DS(ON)}$ Matching
HI3-5041	-5									
HI1-5048	-2, -5, -7	Y	45	2.4	0.8	36V CMOS-DI	0.8	370	280	5Ω $r_{DS(ON)}$ Matching
HI3-5048	-5									
IH5141	CJE, CPE MJE	Y	100	2.4	0.8	36V CMOS-JI	5.0	175	150	TTL/CMOS Logic
IH5341	CPD, ITW, MTW	Y	75	2.4	0.8	36V CMOS-JI	1.0	150	80	RF Video T-Switch

QUAD SINGLE POLE SINGLE THROW SWITCH (4 x SPST, FIGURE 3)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG201	AK, BK, CJ	Y	125	2.4	0.8	36V CMOS-JI	±5.0	1000	500	
DG201A	AK, BK, CJ, CK, BY, CY	Y	175	0.8	2.4	44V CMOS-JI	0.01	480	370	Very Low Leakage
DG202	AK, BK, CJ, CK	Y	175	2.4	0.8	44V CMOS-JI	0.01	480	370	Very Low Leakage
DG211	CJ, CY		175	0.8	2.4	44V CMOS-JI	0.01	460	360	Low Cost
DG212	CJ, CY		175	2.4	0.8	44V CMOS-JI	0.01	460	360	Low Cost
DG308A	AK, BK CJ, CK, CY	Y	60 Typ	11.0	3.5	44V CMOS-JI	0.1	130	90	CMOS Logic, Single or Dual Supply Operation
DG309	AK, BK, CJ, CK, CY	Y	60 Typ	3.5	11.0	44V CMOS-JI	0.1	130	90	CMOS Logic, Single or Dual Supply Operation
DG411	DJ, DY, EJ, EY	Y	35	0.8	2.4	44V CMOS-JI	-0.1	110	100	Very Low $r_{DS(ON)}$
DG412	DJ, DY EJ, EY	Y	35	2.4	0.8	44V CMOS-JI	-0.1	110	100	Very Low $r_{DS(ON)}$
DG413	DJ, DY EJ, EY	Y	35	2.4	0.8	44V CMOS-JI	-0.1	110	100	Very Low $r_{DS(ON)}$ Channel 1, 4 "ON" Channel 2, 3 "OFF"
DG441	DJ, DY EJ, EY	Y	85	0.8	2.4	44V CMOS-JI	0.01	150	90	Low $r_{DS(ON)}$, Low Leakage
DG442	DJ, DY EJ, EY	Y	85	2.4	0.8	44V CMOS-JI	0.01	150	110	Low $r_{DS(ON)}$, Low Leakage
DG444	DJ, DY		85	0.8	2.4	44V CMOS-JI	0.01	150	90	Low $r_{DS(ON)}$, Low Leakage
DG445	DJ, DY		85	2.4	0.8	44V CMOS-JI	0.01	150	110	Low $r_{DS(ON)}$, Low Leakage

QUAD SINGLE POLE SINGLE THROW SWITCH (4 x SPST, FIGURE 3) (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-0201	-2, -4, -5, -7, -8	Y	80	2.4	0.8	44V CMOS-DI	2.0	185	220	
HI3-0201	-5									
HI4P0201	-5									
HI9P0201	-5, -9									
HI4-0201/883		Y								
HI1-0201HS	-2, -4, -5, -7, -8	Y	50	2.4	0.8	36V CMOS-DI	0.3	30	40	High Speed, Low $r_{DS(ON)}$
HI3-0201HS	-4, -5									
HI4P0201HS	-5									
HI9P0201HS	-5, -9									
HI4-0201HS/883		Y								
IH5052	CDE, MDE		100	2.4	0.8	36V CMOS-JI	5.0	1000	500	Low Power
IH5053	CDE, MDE		100	2.4	0.8	36V CMOS-JI	5.0	1000	500	Low Power
IH5352	CPE, IJE, MJE, CBP, IBP	Y	75	2.4	0.8	36V CMOS-JI	2.0	150	80	RF Video T-Switch

FOUR POLE SINGLE THROW SWITCH (4PST, FIGURE 4)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-5047	-2, -5, -7	Y	75	2.4	0.8	36V CMOS-JI	0.8	370	280	10Ω Max $r_{DS(ON)}$ Matching
HI3-5047	-5									
HI1-5047A	-2, -5, -7, -8	Y	45	2.4	0.8	36V CMOS-JI	0.8	370	280	5Ω Max $r_{DS(ON)}$ Matching
HI3-5047A	-5									
HI4P5047A	-5									

SINGLE POLE DOUBLE THROW SWITCH (SPDT, FIGURE 5)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG301A	AA, AK BA, BK CA, CJ, CK	Y	50	4.0	0.8	44V CMOS-JI	0.1	150	130	Channel 1 "ON", Channel 2 "OFF", TTL Inputs

SINGLE POLE DOUBLE THROW SWITCH (SPDT, FIGURE 5) (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-0301	-2, -5, -7	Y	50	4.0	0.8	44V CMOS-DI	0.04	210	160	Very Low Leakage, TTL Inputs Channel 1 "ON" Channel 2 "OFF"
HI2-0301	-2, -5	Y								
HI3-0301	-5									
HI9P0301	-5, -9									
HI1-0305	-2, -5	Y	50	11.0	3.5	44V CMOS-DI	0.04	160	100	15V CMOS Logic Very Low Leakage Channel 1 "ON" Channel 2 "OFF"
HI2-0305	-2, -5	Y								
HI3-0305	-5									
HI9P0305	-5, -9									
HI1-0387	-2, -5	Y	50	4.0	0.8	44V CMOS-DI	0.04	210	160	Channel 1 "ON", Channel 2 "OFF", Very Low Leakage
HI2-0387	-2, -5	Y								
HI3-0387	-5									
HI9P0387	-5, -9									
HI1-5042	-2, -5, -7	Y	75	2.4	0.8	36V CMOS-DI	0.8	370	280	Channel 1 "ON", Channel 2 "OFF", 10Ω Max $r_{DS(ON)}$ Matching
HI3-5042	-5									
HI1-5050	-2, -5, -7	Y	45	2.4	0.8	36V CMOS-DI	0.8	370	280	Channel 1 "ON", Channel 2 "OFF", 5Ω Max $r_{DS(ON)}$ Matching
HI3-5050	-5									
IH5142	CJE, CPE	Y	50	2.4	0.8	36V CMOS-JI	0.5	175	125	

DUAL SINGLE POLE DOUBLE THROW SWITCH (2 x SPDT, FIGURE 6)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG303A	CY, AK, BK, CK, CJ, BY	Y	50	4.0	0.8	44VCMOS-JI	0.1	150	130	TTL and CMOS Compatible
DG403	DJ, DY, EJ, EY	Y	45	2.4	0.8	44V CMOS-JI	-0.01	100	60	
HI1-0303	-2, -5	Y	50	4.0	0.8	44V CMOS-DI	0.04	210	160	Switch 1, 2 "ON", Switch 3, 4 "OFF", Very Low Leakage, TTL Inputs
HI3-0303	-5									
HI9P0303	-5, -9									
HI1-0307	-2, -5, -7	Y	50	11.0	3.5	44V CMOS-DI	0.04	160	100	Switch 1, 2 "ON", Switch 3, 4 "OFF", Very Low Leakage
HI3-0307	-5									
HI9P0307	-5, -9									

DUAL SINGLE POLE DOUBLE THROW SWITCH (2 x SPDT, FIGURE 6) (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-0390	-2, -5	Y	50	4.0	0.8	44V CMOS-DI	0.04	210	160	Switch 1, 2 "ON", Switch 3, 4 "OFF", Very Low Leakage
HI3-0390	-5									
HI9P0390	-5, -9									
HI1-5043	-2, -5 -8	Y	75	2.4	0.8	36V CMOS-DI	0.8	370	280	Switch 1, 2 "ON", Switch 3, 4 "OFF", 10Ω Max $r_{DS(ON)}$ Matching
HI3-5043	-5									
HI9P5043	-5, -9									
HI1-5051	-2, -5, -7, -8	Y	45	2.4	0.8	36V CMOS-DI	0.8	370	280	Switch 1, 2 "ON", Switch 3, 4 "OFF", 5Ω Max $r_{DS(ON)}$ Matching
HI3-5051	-5									
HI4P5051	-5									
HI9P5051	-5, -9									
IH5043	CJE, CPE, CY, MJE	Y	130	2.4	0.8	36V CMOS-JI	5.0	1000	500	Switch 1 "ON" Switch 2 "OFF", Low Power
IH5151	CJE, CPE, MJE	Y	50	2.4	0.8	36V CMOS-JI	1.0	250	200	

DOUBLE POLE SINGLE THROW SWITCH (DPST, FIGURE 7)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-5044	-2, -5, -7	Y	75	2.4	0.8	36V CMOS-DI	0.8	370	280	10Ω Max $r_{DS(ON)}$ Matching
HI3-5044	-5									

DUAL DOUBLE POLE SINGLE THROW SWITCH (2 x DPST, FIGURE 8)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG302A	AK, BK, CK, CJ	Y	50	4.0	0.8	44V CMOS-JI	0.1	150	130	TTL/CMOS Inputs
DG405	DJ, DY, EJ, EY	Y	45	2.4	0.8	44V CMOS-JI	-0.01	100	60	Very Low $r_{DS(ON)}$
HI1-0302	-2, -5	Y	50	4.0	0.8	44V CMOS-DI	0.1	210	160	TTL/5V CMOS Inputs
HI3-0302	-5									
HI9P0302	-5, -9									

DUAL DOUBLE POLE SINGLE THROW SWITCH (2 x DPST, FIGURE 8) (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-0306	-2, -5	Y	50	11.0	3.5	44V CMOS-DI	0.1	160	100	15V CMOS Logic
HI3-0306	-5									
HI9P0306	-5, -9									
HI1-0384	-2, -5	Y	50	4.0	0.8	44V CMOS-DI	0.04	210	160	Very Low Leakage
HI3-0384	-5									
HI9P0384	-5, -9									
HI1-5045	-2, -5, -7	Y	75	2.4	0.8	36V CMOS-DI	0.8	370	280	10Ω Max $r_{DS(ON)}$ Matching
HI3-5045	-5									
HI4-5045/883		Y								
HI9P5045	-5, -9									
HI1-5049	-2, -5, -7	Y	45	2.4	0.8	36V CMOS-DI	0.8	370	280	5Ω $r_{DS(ON)}$ Matching
HI3-5049	-5									
HI9P5049	-5, -9									

DUAL DOUBLE POLE DOUBLE THROW SWITCH (2 x DPDT, FIGURE 9)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-5046	-2, -5, -7	Y	75	0.8	2.4	36V CMOS-DI	0.8	370	280	Switch 1 and 4 "ON" Switch 2 and 3 "OFF" 10Ω Max $r_{DS(ON)}$ Matching
HI3-5046	-5									
HI9P5046	-5, -9									
HI1-5046A	-2, -5, -7	Y	45	0.8	2.4	36V CMOS-DI	0.8	370	280	Switch 1 and 4 "ON" Switch 2 and 3 "OFF" 5Ω Max $r_{DS(ON)}$ Matching
HI3-5046A	-5									

RF/VIDEO "T" SWITCHES ("T" SWITCH, FIGURE 10 and 11)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ Ω MAX	SWITCH "ON" (V)	SWITCH "OFF" (V)	TECHNOLOGY	I_{SOFF} (±nA) TYP	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
IH5341	ITW, MTW, CPD	Y	75	2.4	0.8	36V CMOS-JI	1.0	150	80	Dual SPST
IH5352	MJE	Y	75	2.4	0.8	36V CMOS-JI	1.0	150	80	Quad SPST
IH5352	IJE, CPE, CBP, IBP		75	2.4	0.8	36V CMOS-JI	2.0	150	80	Quad SPST

NOTES:

1. The $r_{DS(ON)}$ of a CMOS switch varies as a function of supply voltage, analog signal voltage, and temperature. Values shown are maximum (unless noted "Typ" = typical) at 25°C.
   SWITCH "ON" V: Digital Threshold to "CLOSE" a particular switch. (Minimum if greater than "OFF". Maximum if less than "OFF".)
   SWITCH "OFF" V: Digital Threshold to "OPEN" a particular switch. (Minimum if greater than "ON". Maximum if less than "ON".)
   V_{INL}: Digital Threshold to represent a "Low" select signal. (Maximum, voltage levels greater than this value are not guaranteed to produce a "LOW".)
   V_{INH}: Digital Threshold to represent a "HIGH" select signal. (Minimum, voltage levels less than this value are not guaranteed to produce a "HIGH".)
2. Package codes:
   DG Types - SUFFIX:
   - A 10 Lead TO-100
   - J Plastic DIP
   - K CERDIP
   - P SBDIP
   - Y SOIC

   IH Types - Middle SUFFIX Letter:
   - J CERDIP
   - P Plastic DIP
   - T Metal Can
   - B SOIC

   HI Types - PREFIX:
   - HI1 CERDIP
   - HI2 Metal Can
   - HI3 Plastic DIP
   - HI4 CLCC
   - HI4P PLCC
   - HI9P SOIC
3. Temperature Code Suffix:
   - -1: 0° to 200°C
   - -2, A, or M: -55°C to 125°C
   - -4 or B: -25°C to 85°C
   - -5: 0°C to 75°C
   - C: 0°C to 70°C
   - -7: 0°C to 75°C with Burn-In
   - -8: -55°C to 125°C with Burn-In
   - -9: -40°C to 85°C
   - /883: MIL-STD-883, Class B, -55°C to 125°C with Burn-In
   - D: -40°C to 85°C
   - E: -40°C to 85°C with Extended Processing Flow
   - I: Industrial, -25°C or -40°C to 85°C, see data sheet

Double Throw switches have one switch ON and the other switch OFF for each input state. See data sheet.

SWITCH CONFIGURATIONS

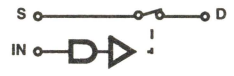


FIGURE 1. SPST

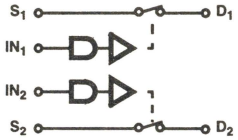


FIGURE 2. DUAL SPST

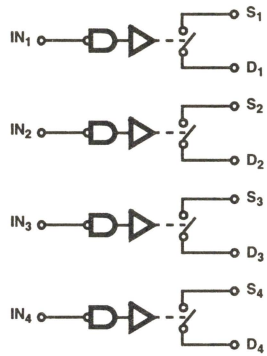


FIGURE 3. QUAD SPST

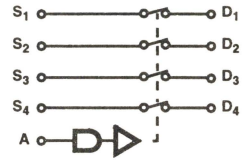


FIGURE 4. 4PST

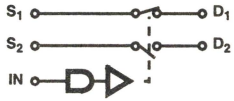


FIGURE 5. SPDT

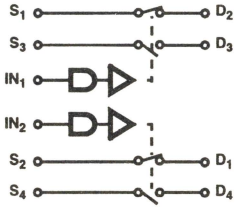


FIGURE 6. DUAL SPDT

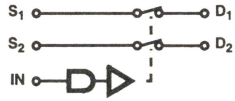


FIGURE 7. DPST

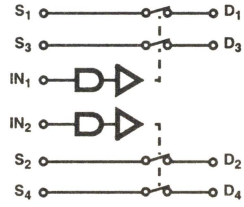


FIGURE 8. DUAL DPST

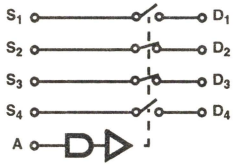


FIGURE 9. DPDT

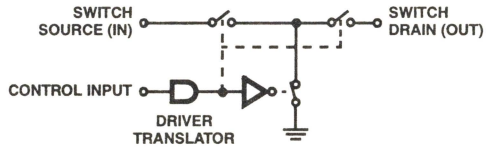


FIGURE 10. "T" SCHEMATIC

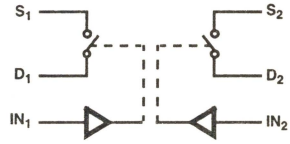


FIGURE 11. "T" SWITCH

SINGLE 1 x 8 MULTIPLEXER (FIGURES 12, 13)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG408	DJ, DY, EJ, EY	Y	40	2.4	0.8	44V CMOS-JI		115	105	Low $r_{DS(ON)}$
DG508A	AK, BK, BY, CJ, CK, CY	Y	450	2.4	0.8	44V CMOS-DI	0.3	250	250	
DG528	AK, BK, BY, CJ, CK, CY	Y	450	2.4	0.8	44V CMOS-JI	0.015	1,000	400	Microprocessor Compatible
HI1-0508	-2, -4, -5, -7, -8, -9	Y	400	2.4	0.8	44V CMOS-DI	0.3	250	250	
HI3-0508	-5									
HI4P0508	-5									
HI9P0508	-5, -9									
HI4-0508/883		Y								
HI1-0508A	-2, -5, -7, -8		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	Active Over-Voltage Protection. See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0508A	-5									
HI1-0518	-2, -5, -8, -9		750	2.4	0.8	33V CMOS-DI	0.015	120	140	Programmable 1 of 8, Differential 2 of 4, Figure 13, See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0518	-5, -9									
HI4-0518	-8									
HI4P0518	-5, -9									
HI9P0518	-5, -9									
HI1-0548	-2, -4, -5	Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	Active Over-Voltage Protection. 7% $r_{DS(ON)}$ Matching. See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0548	-5, -9									
HI4P0548	-5									
HI9P0548	-5, -9									
HI4-0548/883		Y								
HI1-1818A	-2, -5, -7	Y	400	4.0	0.4	40V CMOS-DI	0.1	300	300	
HI3-1818A	-5									
HI4P1818A	-5									

SINGLE 1 x 16 MULTIPLEXER (FIGURE 14)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG406	DJ, DY, EJ, EY	Y	50	2.4	0.8	44V CMOS-JI	0.01	150	70	Low $r_{DS(ON)}$, Low Leakage
DG506A	AK, BK, BY, CJ, CK, CY	Y	450	2.4	0.8	44V CMOS-DI	0.3	250	250	
HI1-0506	-2, -4, -5, -7, -8, -9	Y	400	2.4	0.8	44V CMOS-DI	0.3	250	250	
HI3-0506	-5									
HI4P0506	-5									
HI9P0506	-5, -9									
HI4-0506/883		Y								
HI1-0506A	-2, -5, -7, -8		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	Active Over-Voltage Protection. See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0506A	-5									
HI1-0516	-2, -5, -8	Y	750	2.4	0.8	33V CMOS-DI	0.03	120	140	Programmable, 1 of 16, Differential 2 of 8. See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0516	-5									
HI4-0516	-8	Y								
HI4P0516	-5									
HI9P0516	-5, -9									
HI1-0546	-2, -4, -5, -7	Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	Active Over-Voltage Protection. See Over-Voltage Protected Multiplexers Table, (Note 5) 7% $r_{DS(ON)}$ Matching
HI3-0546	-5, -9									
HI4P0546	-5									
HI9P0546	-5, -9									
HI4-0546/883		Y								

DUAL 1 x 4 MULTIPLEXER (FIGURE 15)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG409	DJ, DY, EJ, EY	Y	40	2.4	0.8	44V CMOS-JI		115	105	Low $r_{DS(ON)}$
DG509A	AK, BK, BY, CJ, CK, CY	Y	400	2.4	0.8	44V CMOS-JI	0.3	250	250	

DUAL 1 x 4 MULTIPLEXER (FIGURE 15) (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG529	AK, BK, BY, CK, CY	Y	450	2.4	0.8	44V CMOS-JI	0.008	1000	400	Microprocessor Compatible
HI1-0509	-2, -4, -5, -7, -8, -9	Y	400	2.4	0.8	44V CMOS-DI	0.3	250	250	
HI3-0509	-5									
HI4P0509	-5									
HI9P0509	-5, -9									
HI4-0509/883		Y								
HI1-0509A	-2, -5, -7, -8		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	Active Over-Voltage Protection, See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0509A	-5									
HI1-0518	-2, -5, -8, -9		750	2.4	0.8	33V CMOS-DI	0.015	120	140	Programmable 1 of 8, Differential 2 of 4, (Figure 2), See Programmable Configuration Table
HI3-0518	-5, -9									
HI4-0518	-8									
HI4P0518	-5, -9									
HI9P0518	-5, -9									
HI1-0539	-2, -4, -5, -8		850	4.0	0.8	33V CMOS-DI	0.001	250	160	Low Level Signals, 3% Max $r_{DS(ON)}$ Matching
HI3-0539	-5									
HI4P0539	-5									
HI1-0549	-2, -4, -5	Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	70V Active Over-Voltage Protection, 7% $r_{DS(ON)}$ Matching, See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0549	-5, -9									
HI4P0549	-5									
HI9P0549	-5, -9									
HI4-0549/883		Y								
HI1-1828A	-2, -5, -7	Y	400	4.0	0.4	40V CMOS-DI	125 Max	300	300	
HI3-1828A	-5									
HI4P1828A	-5, -8									
HI4-1828A/883		Y								

DUAL 1 x 8 MULTIPLEXER (FIGURE 16)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
DG407	DJ, DY, EJ, EY	Y	50	2.4	0.8	44V CMOS-JI	0.01	150	70	Low $r_{DS(ON)}$, Low Leakage
DG507A	AK, BK, BY, CJ, CK, CY	Y	450	2.4	0.8	44V CMOS-JI	0.03	250	250	
DG527	AK, BK, BY, CJ, CK, CY	Y	400	2.4	0.8	44V CMOS-JI	0.2	700	400	Microprocessor Compatible
HI1-0507	-2, -4, -5, -7, -8, -9	Y	400	2.4	0.8	44V CMOS-DI	0.3	250	250	
HI3-0507	-5									
HI4P0507	-5									
HI9P0507	-5, -9									
HI4-0507/883		Y								
HI1-0507A	-2, -5, -7, -8		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	Active Over-Voltage Protection, See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0507A	-5									
HI1-0516	-2, -5, -8	Y	750	2.4	0.8	33V CMOS-DI	0.03	120	140	Programmable, 1 of 16, Differential 2 of 8, See Over-Voltage Protected Multiplexers Table
HI3-0516	-5									
HI4-0516	-8	Y								
HI4P0516	-5									
HI9P0516	-5, -9									
HI1-0547	-2, -4, -5, -9	Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	Active Over-Voltage Protection, 7% $r_{DS(ON)}$ Matching, See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0547	-5, -9									
HI4P0547	-5									
HI9P0547	-5, -9									
HI4-0547/883		Y								

PROGRAMMABLE CONFIGURATION SINGLE (1 OF 16) OR DIFFERENTIAL (2 OF 8) MULTIPLEXER (FIGURE 17)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-0516	-2, -5, -8	Y	750	2.4	0.8	33V CMOS-DI	0.03	120	140	Programmable, 1 of 16, Differential 2 of 8
HI3-0516	-5									
HI4-0516	-8	Y								
HI4P0516	-5									
HI9P0516	-5, -9									

PROGRAMMABLE CONFIGURATION SINGLE (1 OF 8) OR DIFFERENTIAL (2 OF 4) MULTIPLEXER (FIGURE 18)

(NOTES 2, 3) DEVICE	SUFFIX CODES	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	FEATURES
HI1-0518	-2, -5, -8, -9	750	2.4	0.8	33V CMOS-DI	0.015	120	140	Programmable, 1 of 8, Differential 2 of 4
HI3-0518	-5, -9								
HI4-0518	-8								
HI4P0518	-5, -9								

OVER-VOLTAGE PROTECTED MULTIPLEXERS (NOTE 6)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	NO. OF CHANNELS	FEATURES
HI1-0506A	-2, -5, -7		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	1 x 16	
HI3-0506A	-5										
HI4-0506A	-8										
HI1-0507A	-2, -5, -7		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	2 x 8	Differential Inputs
HI3-0507A	-5										
HI4-0507A	-8										

OVER-VOLTAGE PROTECTED MULTIPLEXERS (NOTE 6) (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	NO. OF CHANNELS	FEATURES
HI1-0508A	-2, -5, -7		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	1 x 8	
HI3-0508A	-5										
HI4-0508A	-8										
HI1-0509A	-2, -5, -7		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	2 x 4	Differential Inputs
HI3-0509A	-5										
HI4-0509A	-8										
HI1-0546	-2, -4, -5	Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	1 x 16	7% $r_{DS(ON)}$ Matching
HI3-0546	-5										
HI4P0546	-5										
HI9P0546	-5, -9										
HI4-0546/883		Y									
HI1-0547		Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	2 x 8	7% $r_{DS(ON)}$ Matching Differential Inputs
HI3-0547	-2, -4, -5										
HI4P0547	-5										
HI9P0547	-5, -9										
HI4-0547/883		Y									
HI1-0548	-2, -4, -5	Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	1 x 8	7% $r_{DS(ON)}$ Matching
HI3-0548	-5										
HI4P0548	-5										
HI9P0548	-5, -9										
HI4-0548/883		Y									
HI1-0549	-2, -4, -5	Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	2 x 4	7% $r_{DS(ON)}$ Matching Differential Inputs
HI3-0549	-5										
HI4P0549	-5										
HI9P0549	-5, -9										
HI4-0549/883		Y									

DIFFERENTIAL INPUT MULTIPLEXERS

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	NO. OF CHANNELS	FEATURES
DG507A	AK, BK, BY, CJ, CK, CY	Y	450	2.4	0.8	44V CMOS-JI	0.03	250	250	8	
DG509A	AK, BK, CJ, CK	Y	400	2.4	0.8	44V CMOS-JI	0.3	250	250	4	
HI1-0507	-2, -4, -5, -7, -8, -9	Y	400	2.4	0.8	44V CMOS-DI	0.1	250	250	2 x 8	
HI3-0507	-5										
HI4P0507	-5										
HI9P0507	-5, -9										
HI4-0507/883		Y									
HI1-0507A	-2, -5, -7, -8		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	2 x 8	Active Over-Voltage Protection, See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0507A	-5										
HI4-0507A	-8										
HI1-0509	-2, -4, -5, -7, -8, -9	Y	450	2.4	0.8	44V CMOS-DI	0.3	250	250	2 x 4	
HI3-0509	-5										
HI4P0509	-5										
HI9P0509	-5, -9										
HI4-0509/883		Y									
HI1-0509A	-2, -5, -7, -8		1800	4.0	0.8	44V CMOS-DI	0.1	300	300	2 x 4	Active Over-Voltage Protection, See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0509A	-5										
HI4-0509A	-8										
HI1-0516	-2, -5, -8	Y	1800	4.0	0.8	33V CMOS-DI	0.1	500	500	1 x 16	7% $r_{DS(ON)}$ Matching
HI3-0516	-5										
HI4-0516	-8	Y									
HI4P0516	-5										
HI9P0516	-5, -9										

DIFFERENTIAL INPUT MULTIPLEXERS (Continued)

(NOTES 2, 3) DEVICE	SUFFIX CODES	MIL SPEC	(NOTE 1) $r_{DS(ON)}$ (Ω MAX)	V_{INH} MIN (V)	V_{INL} MAX (V)	TECHNOLOGY	I_{DOFF} TYP (±nA)	t_{ON} (ns) TYP	t_{OFF} (ns) TYP	NO. OF CHANNELS	FEATURES
HI1-0518	-2, -5, -8, -9		750	2.4	0.8	33V CMOS-DI	0.015	120	140	4	Programmable 1 of 8, Differential 2 of 4, Figure 13, See Programmable Configuration Table
HI3-0518	-5, -9										
HI4-0518	-8										
HI4P0518	-5, -9										
HI9P0518	-5, -9										
HI1-0539	-2, -4, -5, -8		850	4.0	0.8	33V CMOS-DI	0.001	250	160	4	Low Level Signals, 3% Max $r_{DS(ON)}$ Matching
HI3-0539	-5										
HI4P0539	-5										
HI1-0547	-2, -4, -5, -9	Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	2 x 8	Active Over-Voltage Protection, 7% $r_{DS(ON)}$ Matching See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0547	-5, -9										
HI4P0547	-5										
HI9P0547	-5, -9										
HI4-0547/883		Y									
HI1-0549	-2, -4, -5	Y	1800	4.0	0.8	44V CMOS-DI	0.1	300	300	2 x 4	70V Active Over-Voltage Protection, 7% $r_{DS(ON)}$ Matching, See Over-Voltage Protected Multiplexers Table, (Note 5)
HI3-0549	-5, -9										
HI4P0549	-5										
HI9P0549	-5, -9										
HI4-0549/883		Y									
HI1-1828A	-2, -5, -7	Y	400	4.0	0.4	40V CMOS-DI	125 Max	300	300	2 x 4	
HI3-1828A	-5										
HI4-1828A	-8	Y									
HI4P1828A	-5										

NOTES:

1. The $r_{DS(ON)}$ of a CMOS switch varies as a function of supply voltage, analog signal voltage, and temperature. Values shown are maximum (unless noted "Typ" = typical) at 25°C.
   SWITCH "ON" V: Digital Threshold to "CLOSE" a particular switch. (Minimum if greater than "OFF". Maximum if less than "OFF".)
   SWITCH "OFF" V: Digital Threshold to "OPEN" a particular switch. (Minimum if greater than "ON". Maximum if less than "ON".)
   V_{INL}: Digital Threshold to represent a "Low" select signal. (Maximum, voltage levels greater than this value are not guaranteed to produce a "LOW".)
   V_{INH}: Digital Threshold to represent a "HIGH" select signal. (Minimum, voltage levels less than this value are not guaranteed to produce a "HIGH".)
2. Package codes:
   DG Types - SUFFIX:
   A Metal Can J Plastic DIP K CERDIP P SBDIP Y SOIC
   IH Types - Middle SUFFIX Letter:
   J CERDIP P Plastic DIP T Metal Can B SOIC HI4P PLCC
   HI Types - PREFIX:
   HI1 CERDIP HI2 Metal Can HI3 Plastic DIP HI4 CLCC HI9 Flatpack HI9P SOIC
3. Temperature Code Suffix:
   -1: 0° to 200°C
   -2, A, or M: -55°C to 125°C
   -4 or B: -25°C to 85°C
   -5: 0°C to 75°C
   C: 0°C to 70°C
   -7: 0°C to 75°C with Burn-In
   -8: -55°C to 125°C with Burn-In
   -9: -40°C to 85°C
   /883: MIL-STD-883, Class B, -55°C to 125°C with Burn-In
   D: -40°C to 85°C
   E: -40°C to 85°C with Extended Process Flow
   I: Industrial, -25°C or -40°C to 85°C, see data sheet.
4. Double Throw switches have one switch ON and the other switch OFF for each input state. See data sheet.
5. Over-Voltage Protection: Analog Inputs can withstand up to 70V peak to peak levels, with no channel interaction.
6. Fault Protection: All channels are OFF when supply power is off, up to 25V inputs. Any channel turns OFF when input exceeds supply rail.

MULTIPLEXER CONFIGURATIONS

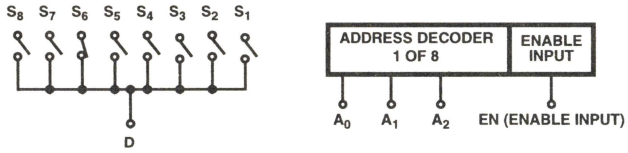


FIGURE 12. 1 x 8 MULTIPLEXER

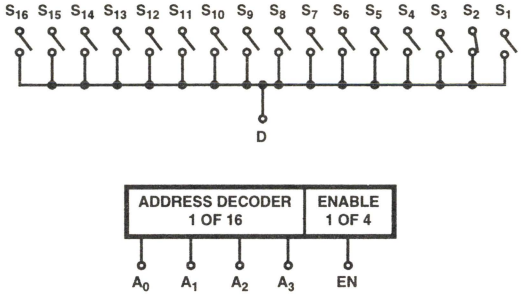


FIGURE 14. 1 x 16 MULTIPLEXER

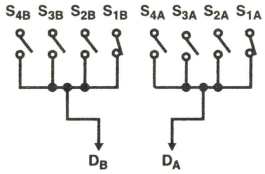
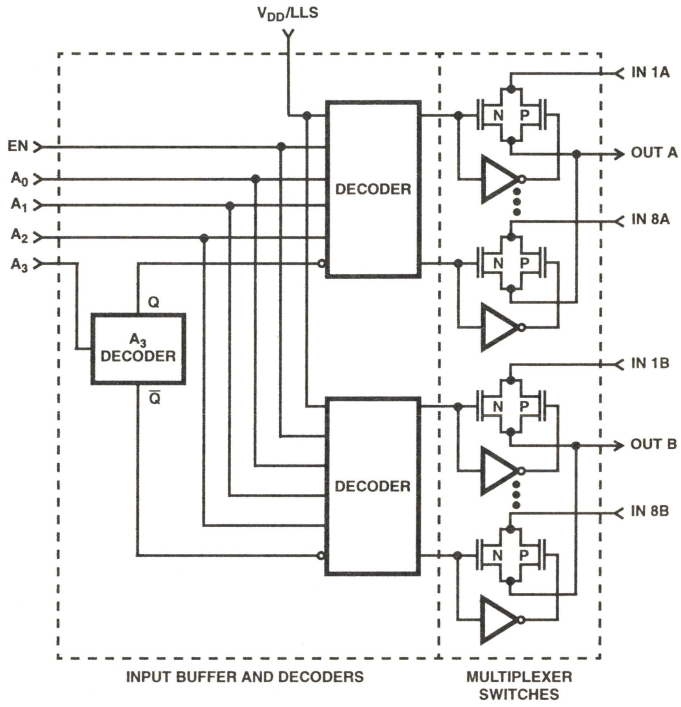


FIGURE 15. DUAL 1 x 4 MUX



A3 DECODER		
A3	Q	Q̄
H	H	L
L	L	H
V-	L	L

FIGURE 13. PROGRAMMABLE

MULTIPLEXER CONFIGURATIONS (Continued)

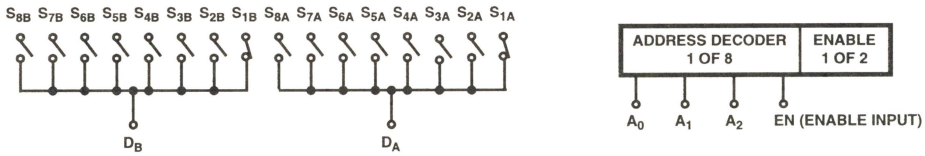
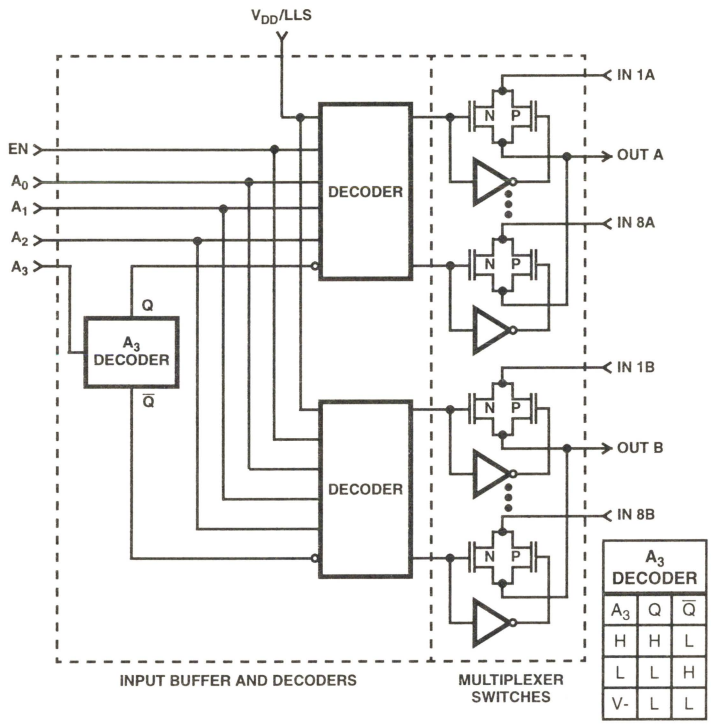
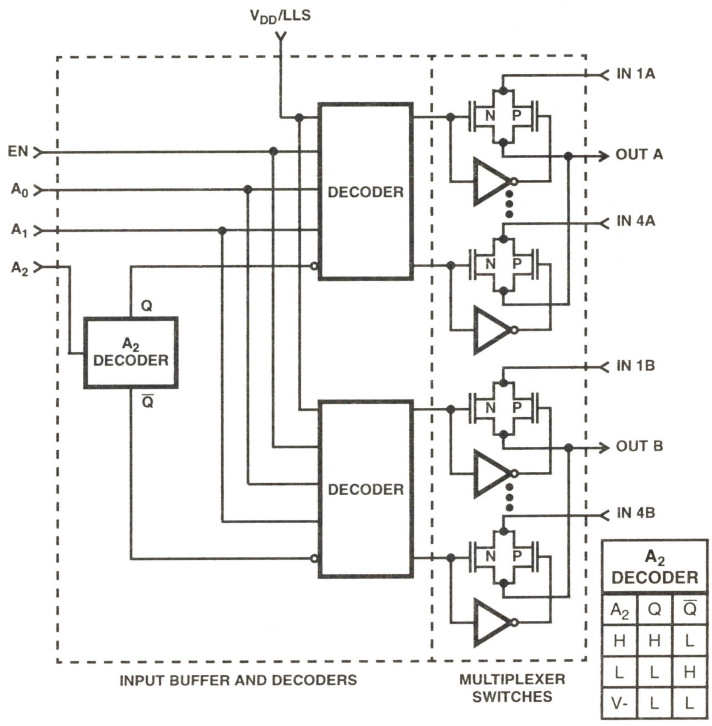


FIGURE 16. DUAL 1 x 8 MUX



A_3 DECODER		
A_3	Q	$\overline{Q}$
H	H	L
L	L	H
V-	L	L

FIGURE 17. PROGRAMMABLE SINGLE 16 OR DIFFERENTIAL 8



A_2 DECODER		
A_2	Q	$\overline{Q}$
H	H	L
L	L	H
V-	L	L

FIGURE 18. PROGRAMMABLE SINGLE 8 OR DIFFERENTIAL 4

REAL-TIME CLOCKS

TYPE	COMMENTS AND APPLICATIONS	NUMBER OF PINS	µP INTERFACE					OSCILLATOR				TIME KEEPING FUNCTIONS								ALARM FUNCTIONS			POWER DOWN MODES			
			STANDARD µP INTERFACE	MUX BUS OPTION	PROGRAMMABLE SQUARE WAVE OUTPUT SIGNAL	INTERRUPTS	BYTES OF GENERAL PURPOSE RAM	ON BOARD OSCILLATOR	60Hz LINE	4.197MHz, 1.049MHz, 32.768kHz XTAL	2.097MHz XTAL	READS SEC., MIN., HR., DAY, MONTH	READS YEAR, DATE	DAYLIGHT SAVINGS TIME	AUTOMATIC END OF MONTH RECOGNITION	AUTOMATIC LEAP YEAR COMPENSATION	12 OR 24 HOUR CLOCK WITH AM/PM	BCD FORMAT AVAILABLE	1/10s, 1/100s ALARM	SEC., MIN., HR. ALARM	DAY, MONTH, YEAR, DATE ALARM	POWER SENSE INPUT/DETECTION	BATTERY INPUT PIN	STANDBY TIME KEEPING	POWER DOWN MODE (µA)
1800 SERIES																										
CDP1879	Real-Time Clock, 4V to 10.5V Operation	24	•		•	•		•		•	•	•						•			•					50
6805 SERIES																										
CDP6818 CDP6818A	Real-Time Clock, RAM, Motel Bus for Connection to any µP	24	•	•	•	•	50	•		•		•	•	•	•	•	•	•			•		•			50
CDP68HC68T1	Real-Time Clock with RAM and Power Sense/Control, 3-Wire SPI Bus Peripheral	16			•	•	32	•	•	•	•	•	•								•		•	•	•	12
GENERAL																										
ICM7170	Real-Time Clock-Time Keeping and Date Stamping for Personal Computers, Communica-tions, Robotics, Auto, etc.	24	•	•		•		•		•	•	•	•		•	•	•		•	•	•	•	•	•	•	5

TIMER/COUNTERS

TYPE	COMMENTS AND APPLICATIONS	µP I/F		COUNTER MODES						COUNTERS								
		STANDARD 8-BIT µP INTERFACE (RD, WR)	INTERRUPT ON TERMINAL COUNT	TIMEOUT OUTPUT CHANGES WHEN COUNTER DECREMENTS TO "0"	TIMEOUT STROBE ONE CLOCK-WIDE OUTPUT PULSE WHEN COUNTER DECREMENTS TO "0"	GATE CONTROLLED ONE-SHOT OUTPUT CHANGES WHEN COUNTER DECREMENTS TO "0". RETRIGGERABLE	SOFTWARE-CONTROLLED ONE-SHOT OUTPUT CHANGES WHEN COUNTER DECREMENTS TO "0". RETRIGGERABLE	RATE GENERATOR REPETITIVE CLOCK-WIDE OUTPUT PULSE	VARIABLE DUTY CYCLE REPETITIVE OUTPUT WITH PROGRAMMED FREQUENCY AND DUTY CYCLE	COUNTER FREQUENCY (MHz)	NUMBER OF CLOCK INPUTS	GATE ENABLED COUNTING	NUMBER OF GATES	NUMBER OF OUTPUTS	BINARY COUNTING	BCD COUNTING	NUMBER OF 16-BIT DOWN COUNTERS	NUMBER OF 8-BIT DOWN COUNTERS
1800 SERIES																		
CDP1878	Dual Timer/ Counter Power Supply, Motor Control, Square Wave Generators, One-Shot 4V to 10.5V Operation CDP1800 Series Peripheral	•	•	•	•	•		•	•	1	2	•	2	2	•		2	
80C86/88 SERIES																		
82C54	Programmable Interval Timer/ Counter for Generation of Accurate Time Delays Under Software Control in 80C86/88 System, Real-Time Clock, Motor Control, Watchdog Timer, Square Wave Gen.	•	•	•	•	•	•	•	• (Note 1)	10	3	•	3	3	•	•	3	
6805 SERIES																		
CDP68HC68W1	Digital Pulse Width Modulator, Modulates a Clock Input to Supply a Variable Freq. and Duty-Cycle Output Signal. 8-Lead DIP 6805 SPI Bus Serial I/F Motor Control								•	8	1			1	•			2

NOTE:

1. Reloading of count register will allow variable duty cycle. Otherwise this mode generates a square wave output.

TIMER/COUNTERS WITH DISPLAY DRIVERS

TYPE	COMMENTS AND APPLICATIONS	DISPLAY					FUNCTIONS															MAX COUNT SPEED (MHz)
		LED			LCD	VF	UNIT COUNT				UNIVERSAL COUNTERS											
		COMMON ANODE, NON-MUX	COMMON CATHODE, MUX	COMMON ANODE, MUX	DIRECT DRIVE, NON-MUX	NON-MUX	UP/DOWN	UP ONLY	DECADE	MODULE 60 (HR/MIN/SEC)	FREQUENCY	PERIOD	FREQUENCY RATIO	TIME INTERVAL	MUX BCD OUTPUTS	DISPLAY LATCH	DISPLAY BLANKING	COUNT ENABLE	LEADING ZERO BLANKING	PRESET COUNT	COMPARISON REGISTER	EQUAL AND ZERO OUTPUT	
4 DIGIT																						
ICM7217	Industrial Control: Preset Predetermining Counters, Sequencers, On Off Delay Timers, Batch Counters. Presets and Loads Compare Register From Thumbwheel Switches			•			•		•		(Note 1)				•	•	•		•	•	•	•	2
ICM7217A			•				•		•		(Note 1)				•	•	•		•	•	•	•	2
ICM7217B				•			•			•					•	•	•		•	•	•	•	2
ICM7217C			•				•			•					•	•	•		•	•	•	•	2
4.5 DIGIT																						
ICM7224	10μA Operating Current, Can Be Cascaded for More Digits				•			•	•		(Note 1)					•		•	•				15
5.5 DIGIT																						
ICM7249	Event Timer Counter, Hour Meter. 14 Programmable Modes. Selectable Input Filtering				•			•	•					•									
7 DIGIT																						
ICM7208	Use with ICM7202A for a 7 Digit Frequency Counter		•					•	•		(Note 1)					•	•	•	•				2.5
8 DIGIT																						
ICM7216A	Universal Frequency Counter with Display Drivers. 4 Internal Gate Times, Auto Decimal Point, Leading Zero Blanking, Overflow Indication. Display Off, Hold, and Reset Inputs.			•				•	•		•	•	•	•		•	•		•				10
ICM7216B			•					•	•		•	•	•	•		•	•		•				10
ICM7216D			•					•	•		•					•	•		•				10
ICM7226A	Same as ICM7216 Plus Period and Time Interval Averaging. BCD Outputs, μP PIA Compatible			•				•	•		•	•	•	•	•	•	•	•	•				10
ICM7226B			•					•	•		•	•	•	•	•	•	•	•	•				10

NOTE:

1. These counters will measure frequency when used with the ICM7207 (0.01s or 0.1s timebase) or the ICM7207A (0.1s and 1s timebase).

DISPLAY DRIVERS

TYPE	COMMENTS AND APPLICATIONS	NUMBER OF CHARACTERS OR DIGITS						DISPLAY TYPE						FONT			INTERFACE				
		NUMBER OF 7-SEGMENT DIGITS	NUMBER OF DECIMAL POINTS OR ANNUNCIATORS	NUMBER OF ALPHANUMERIC 14 SEGMENTS + DP	NUMBER OF ALPHANUMERIC 16 SEGMENTS + DP	NUMBER OF ALPHANUMERIC 18 SEGMENTS	NUMBER OF DOT MATRIX	LED, COMMON ANODE NON-MUX	LED, COMMON CATHODE MUX	LED, COMMON ANODE MUX	LCD, DIRECT DRIVE	LCD, NUMBER OF WAYS MUX'D	VACUUM FLUORESCENT	HEXADECIMAL (0-9, A-F)	CODE B (0-9, H, E, L, P, -, AND BLANK)	ASCII	MUX BCD (BCD + DIGIT SELECT STROBES)	RANDOM ACCESS (DATA + ADDRESS + WR)	BIT PARALLEL, DIGIT SERIAL	BIT SERIAL	CYCLE TIME (ns)
ICM7211	Drives Conventional LCD Displays. Includes RC Oscillator, Divider Chain, Latches, Interface and LCD Drivers	4									•			•			•				1000
ICM7211A		4									•				•		•				1000
ICM7211M		4									•			•				•			200
ICM7211AM		4									•				•			•			200
ICM7212AM	Drives Common Anode LED Displays. 28 Current Controlled Outputs. Includes Latches, Interface and Brightness Control.	4						•							•			•			200
ICM7218A	3 Decode Formats Drives Up to 64 Independent LEDs. Includes 8 x 8 Memory, Multiplexed LED Drivers, Encoders, Interface and Control. Applications Include Bar Graphs.	8	8							•				•	•				•		550
ICM7218B		8	8						•					•	•			•			550
ICM7218C		8	8							•				•	•			•			500
ICM7218D		8	8						•					•	•			•			500
ICM7228A		8	8							•				•	•			•			550
ICM7228B		8	8						•					•	•			•			550
ICM7228C		8	8							•				•	•			•			500
ICM7228D		8	8						•					•	•			•			500
ICM7231BF	8 Digits, 16 Annunciators on COM 3, Code B	8	16									3			•			•			500
ICM7232B	10 Digits, 20 Annunciators on COM 3, Code B	10	20									3			•					•	350
ICM7232C	10 Digits, 20 Annunciators on COM 1 +3, Code B	10	20									3			•					•	350
ICM7243A	8 Alphanumeric Characters + Decimal pt. can be Daisy Chained or Cascaded				8				•							•		•	•		250
ICM7243B				8					•							•		•	•		250
CA3161	BCD-to-Seven Segment Decoder Driver	1						•							•						2600

TIMERS/OSCILLATORS

PART NUMBER	DESCRIPTION	MAX OUTPUT FREQ. (ASTABLE)	TEMP RANGE	POWER SUPPLY REQUIREMENT	PACKAGE TYPES
CA555	Industry Standard Bipolar Timer Replaces: SE555, NE555, MC1555, MC1455	10kHz (Typ)	COM, IND, MIL	+4.5V to +18V at 15mA	8 Lead CAN 8 Lead SOIC 8 Lead Plastic DIP
ICM7555	Low Power CMOS Equivalent of Industry Standard 555 Timer-Only 80µA Supply Current. Does Not Have the Large Supply Current Transients of the Bipolar 555 and Does Not Require the Large Bypassing Capacitors Needed By the 555. Low Leakage Threshold and Trigger Inputs Allow Use of Higher Impedance RC Timing Components for Extra Long Time Delay.	1MHz (Typ)	COM, IND, MIL	+2V to +18V at 300µA	8 Lead CAN 8 Lead SOIC 8 Lead Plastic DIP
ICM7556	A Dual ICM7555, CMOS, Low Power Equivalent of the Bipolar 556 Timer.	1MHz (Typ)	COM, IND, MIL	+2V to +18V at 600µA	14 Lead Plastic DIP 14 Lead CERDIP
ICM7242	Long-Range Fixed Timer. RC Oscillator +8-Bit Counter. Fixed 256 Count. Used for Extremely Long Time Delays. Cascadable. Can Be Used for Delay Times in Excess of Several Days.	2MHz (Typ)	COM, IND	+2V to +16V at 800µA	8 Lead Plastic DIP 8 Lead SOIC
HA7210, HA7211	32.768kHz Micropower Clock Oscillator, Very Low Power Crystal-Controlled Oscillator, Externally Programmed to Operate - 10kHz to 10MHz, Very high Stability, Over Voltage and Temperature Range.	10MHz	IND	+2V to +7V at 5µA	8 Lead PDIP 8 Lead SOIC Die
ICM7207	CMOS Oscillator Controller	10MHz	IND	4V - 5.5V	Plastic DIP
ICM7209	Clock Generator	10MHz	IND	4.5V - 5.5V	Plastic DIP

SPECIAL PURPOSE CIRCUITS

ICL8038
PRECISION WAVEFORM GENERATOR/VCO

Features

- Provides High Accuracy Sine, Square, Triangular, Sawtooth And Pulse Waveforms
- Wide Operating Frequency Range. . . . . .0.001Hz - 300kHz
- Low Frequency Drift. . . . . 250ppm/^{o}C
- Low Distortion (1% - Sinewave, 0.1% Tri-Wave)
- Simultaneous Outputs
- 14 Lead CERDIP and 14 Lead Plastic DIP

Applications

- Ring Generation (Telecom)
- Frequency Synthesis

ICL8069
LOW VOLTAGE REFERENCE (1.2V)

Features

- Bandgap Type Achieves Low Noise, Excellent Stability
- Low Bias Current (50µA Min) - Good For Battery Powered Applications
- Low Cost
- 2 Terminal TO-52 Package
- 50ppm/^{o}C Temperature Coefficient

Applications

- A/D and D/A Reference Voltages
- Threshold Detectors
- Voltage Regulators

AD590
2-WIRE, CURRENT OUTPUT TEMPERATURE TRANSDUCER

Features

- Current Output. . . . . 1µA/^{o}C
- Wide Supply Range . . . . . +4V to +30V
- Easy to Use
- Wide Temperature Range . . . . . -55^{o}C to 150^{o}C
- 2 Terminal TO-52 Package

Applications

- General Purpose Temperature Sensing
- Remote Temperature Sensing

ICL232, HIN232
+5V POWERED DUAL RS-232 TRANSMITTER/RECEIVER

AnswerFAX Document # 3020

- Meets All RS-232E Specifications
- Requires Only Single +5V Power Supply
- On Board Voltage Doubler/Inverter
- Low Power Consumption
- 2 Drivers
  - ±9V Output Swing for +5V Input
  - 300Ω Power-off Source Impedance
  - Output Current Limiting
  - TTL/CMOS Compatible
  - 30V/µs Maximum Slew Rate
- 2 Receivers
  - ±30V Input Voltage Range
  - 3kΩ to 7kΩ Input Impedance
  - 0.5V Hysteresis to Improve Noise Rejection
- All Critical Parameters are Guaranteed Over the Entire Commercial, Industrial and Military Temperature Ranges

Data Acquisition Package Selection Guide

Using the Selection Guide:

The first character of each entry indicates the package type, while the number preceding the decimal point details the package lead count. Except for MQFP, LCC, SIP, and Can packages, the decimal point and succeeding numbers specify the reference package width in inches (e.g. __.150 = 150 mil width).

PART NUMBER	PDIP	SOIC/ SSOP	PLCC	MQFP	CERDIP	SBDIP	CLCC	SIP	CAN
AD590									T3.A
AD7520	E16.3				F16.3				
AD7521	E18.3								
AD7523	E16.3								
AD7530	E16.3								
AD7531	E18.3								
AD7533	E16.3								
AD7541	E18.3								
AD7545	E20.3								
ADC0802	E20.3				F20.3				
ADC0803	E20.3	M20.3			F20.3				
ADC0804	E20.3				F20.3				
CA3161	E16.3								
CA3162	E16.3								
CA3162A	E16.3								
CA3304	E16.3	M16.3			F16.3				
CA3306	E18.3	M20.3			F18.3		J20.B		
CA3310	E24.3	M24.3			F24.3				
CA3318	E24.6	M24.3			F24.6				
CA3338	E16.3	M16.3			F16.3				
CA555	E8.3	M8.15							T8.C
DG200	E14.3				F14.3				T10.B
DG201	E16.3				F16.3				
DG201A	E16.3	M16.3			F16.3				
DG202	E16.3				F16.3				
DG211	E16.3	M16.15							
DG212	E16.3	M16.15							
DG300A	E14.3				F14.3				T10.B
DG301A	E14.3				F14.3				T10.B
DG302A	E14.3				F14.3				
DG303A	E14.3	M16.3			F14.3				
DG308A	E16.3	M16.15			F16.3				
DG309	E16.3	M16.15			F16.3				
DG401	E16.3	M16.15			F16.3				
DG403	E16.3	M16.15			F16.3				
DG405	E16.3	M16.15			F16.3				
DG406	E16.3	M28.3							

EXAMPLE: M 16 .15

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

Data Acquisition Package Selection Guide

PART NUMBER	PDIP	SOIC/ SSOP	PLCC	MQFP	CERDIP	SBDIP	CLCC	SIP	CAN
DG407	E28.6	M28.3							
DG408	E16.3	M16.15			F16.3				
DG409	E16.3	M16.15			F16.3				
DG411	E16.3	M16.15			F16.3				
DG412	E16.3	M16.15			F16.3				
DG413	E16.3	M16.15			F16.3				
DG441	E16.3	M16.15			F16.3				
DG442	E16.3	M16.15			F16.3				
DG444	E16.3	M16.15							
DG445	E16.3	M16.15							
DG506A	E28.6	M28.3			F28.6				
DG507A	E28.6	M28.3			F28.6				
DG508A	E16.3	M16.3			F16.3				
DG509A	E16.3	M16.3			F16.3				
HA7210	E8.3	M8.15							
HA7211		M8.15							
HI-0200	E14.3				F14.3				T10.B
HI-0201	E16.3	M16.15	N20.35		F16.3				
HI-0201-HS	E16.3	M16.3	N20.35		F16.3		J20.A		
HI-0300	E14.3	M14.15			F14.3				T10.B
HI-0301	E14.3	M14.15			F14.3				T10.B
HI-0302	E14.3	M14.15			F14.3				
HI-0303	E14.3	M14.15			F14.3				
HI-0304	E14.3	M14.15			F14.3				T10.B
HI-0305	E14.3	M14.15			F14.3				T10.B
HI-0306	E14.3	M14.15			F14.3				
HI-0307	E14.3	M14.15			F14.3				
HI-0381	E14.3	M14.15			F14.3				T10.B
HI-0384	E16.3	M16.3			F16.3				
HI-0387	E14.3	M14.15			F14.3				T10.B
HI-0390	E16.3	M16.3			F16.3				
HI-0506	E28.6	M28.3	N28.45		F28.6		J28.A		
HI-0506A	E28.6				F28.6				
HI-0507	E28.6	M28.3	N28.45		F28.6		J28.A		
HI-0507A	E28.6				F28.6				
HI-0508	E16.3	M16.15	N20.35		F16.3		J20.A		
HI-0508A	E16.3				F16.3				
HI-0509	E16.3	M16.15	N20.35		F16.3		J20.A		
HI-0509A	E16.3				F16.3				
HI-0516	E28.6	M28.3	N28.45		F28.6		J28.A		
HI-0518	E18.3	M18.3	N20.35		F18.3		J20.A		

EXAMPLE: M 16 .15

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

Data Acquisition Package Selection Guide

PART NUMBER	PDIP	SOIC/ SSOP	PLCC	MQFP	CERDIP	SBDIP	CLCC	SIP	CAN
HI-0524	E18.3		N20.35		F18.3		J20.A		
HI-0539	E16.3		N20.35		F16.3				
HI-0546	E28.6	M28.3	N28.45		F28.6		J28.A		
HI-0547	E28.6	M28.3	N28.45		F28.6		J28.A		
HI-0548	E16.3	M16.15	N20.35		F16.3		J20.A		
HI-0549	E16.3	M16.15	N20.35		F16.3		J20.A		
HI-0565A						D24.6			
HI-0574A	E28.6					D28.6	J44.A		
HI-0674A	E28.6					D28.6	J44.A		
HI-0774	E28.6					D28.6	J44.A		
HI1106	E24.4-S	M24.2-S							
HI1166							J68.A		
HI1171		M24.2-S							
HI1172	E16.3A-S	M16.2-S							
HI1175	E24.4-S	M24.2-S							
HI1176				Q32.7x7-S					
HI1177				Q32.7x7-S					
HI1178				Q48.12x12-S					
HI1179				Q32.7x7-S					
HI1276							J68.B		
HI1386	E28.6A-S						J44.B		
HI1396						D42.6	J68.A		
HI1826				Q32.7x7-S					
HI1866				Q48.12x12-S					
HI2300				Q32.7x7-S					
HI2302				Q32.7x7-S					
HI2303				Q80.14x20-S					
HI2304				Q48.7x7-S					
HI2307				Q64.10x10-S					
HI2309				Q48.12x12-S					
HI2315				Q32.7x7-S					
HI3026				Q48.12x12-S					
HI3026A				Q48.12x12-S					
HI3086				Q48.12x12-S					
HI3197				TBD					
HI3050				Q64.14x20-S					
HI-1818A	E16.3		N20.35		F16.3				
HI-1828A	E16.3		N20.35		F16.3		J20.A		
HI-5040	E16.3				F16.3				
HI-5041	E16.3				F16.3				
HI-5042	E16.3				F16.3				

EXAMPLE: M 16 .15

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

Data Acquisition Package Selection Guide

PART NUMBER	PDIP	SOIC/ SSOP	PLCC	MQFP	CERDIP	SBDIP	CLCC	SIP	CAN
HI-5043	E16.3	M16.15			F16.3		J20.A		
HI-5044	E16.3				F16.3				
HI-5045	E16.3	M16.15			F16.3				
HI-5046	E16.3				F16.3				
HI-5046A	E16.3				F16.3				
HI-5047	E16.3				F16.3				
HI-5047A	E16.3				F16.3				
HI-5048	E16.3				F16.3				
HI-5049	E16.3	M16.15			F16.3				
HI-5050	E16.3				F16.3				
HI-5051	E16.3	M16.15	N20.35		F16.3		J20.A		
HI5662				Q44.10x10					
HI-5701	E18.3	M18.3							
HI5702		M28.3							
HI5703		M28.3							
HI5710				Q48.7x7-S					
HI5714		M24.3							
HI5721	E28.6	M28.3							
HI5728				Q44.10x10					
HI5731	E28.6	M28.3							
HI5735	E28.6	M28.3							
HI5741	E28.6	M28.3							
HI5746		M28.3							
HI5760		M28.3							
HI5762				Q44.10x10					
HI5766		M28.3							
HI5767		M28.3							
HI5780				Q32.7x7-S					
HI5800						D40.6			
HI5804		M28.3							
HI5805		M28.3							
HI5808		M28.3							
HI5810	E24.3	M24.3			F24.3				
HI5812	E24.3	M24.3			F24.3				
HI5813	E24.3	M24.3			F24.3				
HI5905				Q44.10x10					
HI7131	E40.6			Q44.10x10					
HI7133	E40.6			Q44.10x10					
HI7159A	E28.6								
HI7188	E40.6			Q44.10x10					
HI7190	E20.3	M20.3							

EXAMPLE: M 16 .15

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

Data Acquisition Package Selection Guide

PART NUMBER	PDIP	SOIC/ SSOP	PLCC	MQFP	CERDIP	SBDIP	CLCC	SIP	CAN
HI7191	E20.3	M20.3							
HI20201	E28.6A-S	M28.3A-S							
HI20203	E28.6A-S	M28.3A-S							
HI-DAC80V	E24.6								
HI-DAC85V	E24.6								
HIN200		M20.3							
HIN201		M16.3							
HIN202	E16.3	M16.3/ M16.209							
HIN203	E20.3	M20.3							
HIN204		M16.3							
HIN205	E24.3								
HIN206	E24.3	M24.3/ M24.209							
HIN207	E24.3	M24.3/ M24.209							
HIN208	E24.3	M24.3/ M24.209							
HIN209	E24.3	M24.3							
HIN211		M28.3/ M28.209							
HIN213		M28.3/ M28.209							
HIN230		M20.3							
HIN231		M16.3							
HIN232	E16.3	M16.3			F16.3				
HIN233	E20.3								
HIN234		M16.3							
HIN235	E24.3								
HIN236	E24.3	M24.3							
HIN237	E24.3	M24.3							
HIN238	E24.3	M24.3							
HIN239		M24.3							
HIN240				Q44.10x10					
HIN241		M28.3/ M28.209							
ICL232	E16.3	M16.3			F16.3				
ICL7106	E40.6			Q44.10x10					
ICL7107	E40.6			Q44.10x10					
ICL7109	E40.6				F40.6	D40.6			
ICL7116	E40.6			Q44.10x10					
ICL7117	E40.6								
ICL7126	E40.6								

EXAMPLE: **M 16 .15**

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

Data Acquisition Package Selection Guide

PART NUMBER	PDIP	SOIC/ SSOP	PLCC	MQFP	CERDIP	SBDIP	CLCC	SIP	CAN
ICL71C03	E28.6								
ICL7129	E40.6			Q44.10x10					
ICL7135	E28.6								
ICL7136	E40.6			Q44.10x10					
ICL7137	E40.6			Q44.10x10					
ICL7139	E40.6								
ICL7149	E40.6			Q44.10x10					
ICL8052	E14.3				F14.3	D14.3			
ICL8068					F14.3	D14.3			
ICL8069		M8.15						Z3.05	T2.A
ICM7170	E24.6	M24.3			F24.6	D24.6			
ICM7211	E40.6			Q44.10x10					
ICM7212	E40.6								
ICM7213	E14.3								
ICM7216A	E28.6				F28.6				
ICM7216B	E28.6				F28.6				
ICM7216D	E28.6				F28.6				
ICM7217	E28.6				F28.6				
ICM7224	E40.6								
ICM7226A	E40.6								
ICM7226B					F40.6				
ICM7228	E28.6	M28.3			F28.6				
ICM7231	E40.6				F40.6				
ICM7232	E40.6				F40.6				
ICM7242	E8.3	M8.15							
ICM7243	E40.6				F40.6				
ICM7249	E48.6								
ICM7555	E8.3	M8.15							T8.C
ICM7556	E14.3				F14.3				
IH5043	E16.3	M16.15			F16.3				
IH5052					F16.3				
IH5053					F16.3				
IH5151	E16.3				F16.3				
IH5341	E14.3								T10.B
IH5352	E16.3	M20.3			F16.3				T10.B

EXAMPLE: M 16 .15

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Package information is available in Section 16.

DSP 5

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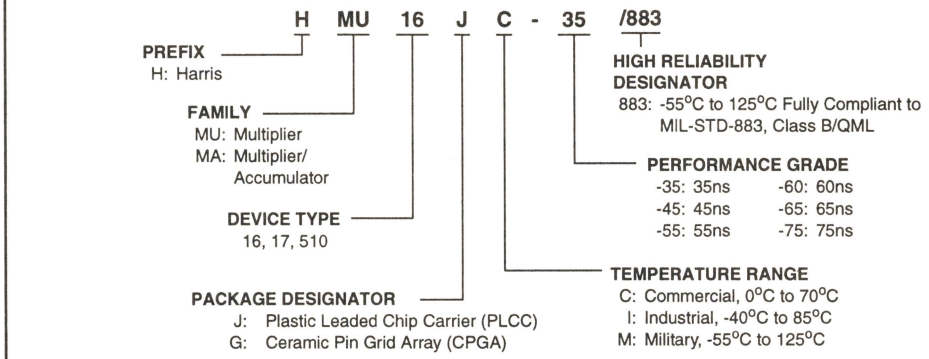
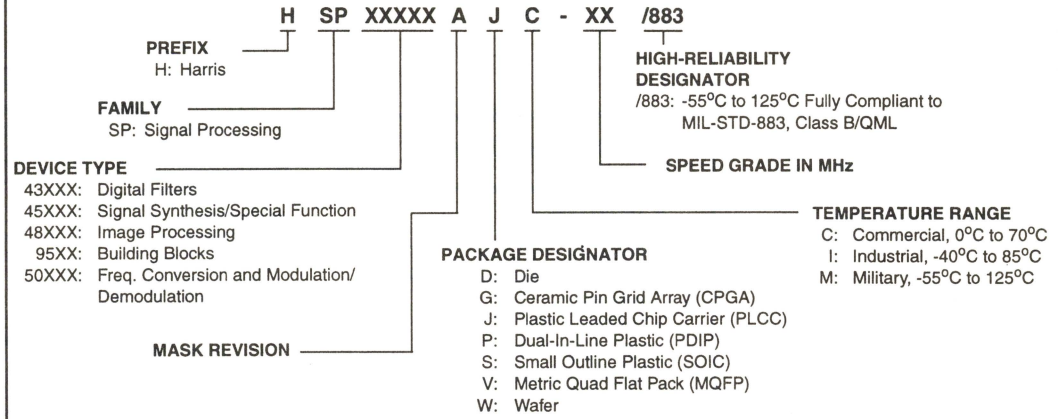
Digital Signal Processing Ordering Nomenclature

HMU/HMA TYPES



HSP TYPES



NOTE: Suffix EV, EVAL: Evaluation Kit (Available for some products)

Digital Signal Processing Product Selection Tree

DSP PRODUCTS

DEVELOPMENT TOOLS

DECI•MATE™
HSP43220 Decimating Digital Filter Development Software

HSP-EVAL
DSP Evaluation Platform

HSP45116-DB (Note 2)
HSP45116 Daughter Board

HSP50016-EV
DDC Evaluation Platform

SERINADE™
HSP43124 Serial I/O Filter Development Software

HSP50110/210EVAL
DSP Demodulator Evaluation Kit

HSP50307EVAL (Note1)
Burst QPSK Modulator Evaluation Board

ST-114 (Note 1)
HSP50214 Programmable Down Converter Evaluation Board

HSP50215EVAL (Note1)
Digital Up Converter Evaluation Kit

SIGNAL SYNTHESIZERS

HSP45102
12-Bit Numerically Controlled Oscillator

HSP45106
16-Bit Numerically Controlled Oscillator

HSP45116
Numerically Controlled Oscillator/Modulator

HSP45116A
Numerically Controlled Oscillator/Modulator

COMMUNICATIONS

HSP50016
Digital Down Converter

HSP50110 (Demod Chip Set)
Digital Quadrature Tuner

HSP50210 (Demod Chip Set)
Digital Costas Loop

HSP50306 (Note 1)
Digital QPSK Demodulator

HSP50307 (Note 1)
Burst QPSK Modulator

HSP50214 (Note 1)
Programmable Down Converter

HSP50215 (Note1)
Digital Up Converter

VIDEO PROCESSING

HSP48212
Digital Video Mixer

HSP48410
Histogrammer/Accumulating Buffer

HSP48901
3 x 3 Image Filter

HSP48908
Two Dimensional Convolver

HSP9501
Programmable Data Buffer

MULTIPLIERS

HMA510
16 x 16-Bit CMOS Parallel Multiplier Accumulator

HMU16
16 x 16-Bit CMOS Parallel Multiplier

HMU17
16 x 16-Bit CMOS Parallel Multiplier

DIGITAL FILTERS

HSP43168
Dual FIR Filter

HSP43220
Decimating Digital Filter

HSP43124
Serial I/O Filter

HSP43216
Halfband Filter

HSP43881
Digital Filter

HSP43891
Digital Filter

SPECIAL FUNCTION

HSP45240
Address Sequencer

HSP45256
Binary Correlator

HSP9520
Multilevel Pipeline Register

HSP9521
Multilevel Pipeline Register

NOTE:

1. New product.
2. Is a daughter board for HSP-EVAL.

DECI•MATE™ is a trademark of Harris Corporation.
SERINADE™ is a trademark of Harris Corporation.

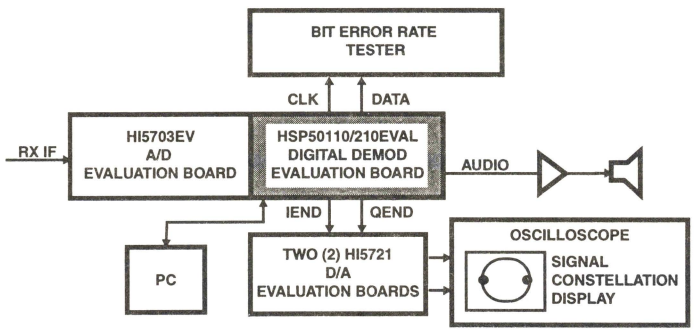
Digital Signal Processing Evaluation Boards

PART NUMBER	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	DOCUMENT #
HSP45116, HSP45116A	HSP-EVAL, HSP45116-DB	HSP45116, DSP Evaluation Mother Board, Numerically Controlled Oscillator, Evaluation Daughter Board	3366, 3367
HSP50016	HSP50016-EV	HSP50016, Digital Down Converter, Evaluation Platform	3637
HSP50110	HSP50110/210EVAL	HSP50110/HSP50210EVAL, Demod Chipset Evaluation Kit	4149
HSP50210	HSP50110/210EVAL	HSP50110/HSP50210EVAL, Demod Chipset Evaluation Kit	4149
HSP43124	HSP50110/210EVAL	HSP50110/HSP50210EVAL, Demod Chipset Evaluation Kit	4149
HSP50307	HSP50307EVAL1	Burst QPSK Modulator Evaluation Board	4239
HSP50214, HSP50214A, HSP50214B	ST-114	Programmable Down Converter Evaluation Board	4305, 4266
HSP50215	HSP50215EV	Digital Up Converter Evaluation Board	4663

PART NUMBER	DEVELOPMENT SOFTWARE	DESCRIPTION	DOCUMENT #
HSP43124	SERINADE	HSP43124 Serial I/D Filter Prototype and Design Software	RM-002
HSP50110/210EVAL	SERINADE	HSP43124 Serial I/D Filter Prototype and Design Software	RM-002
HSP43220	DECIMATE	HSP43220 DFF Development Software for Prototype Filter Designs	RM-001, 3368

COMMON DSP EVALUATION BOARD CONFIGURATIONS

NOTE: Shaded area indicates DSP Evaluation Board.



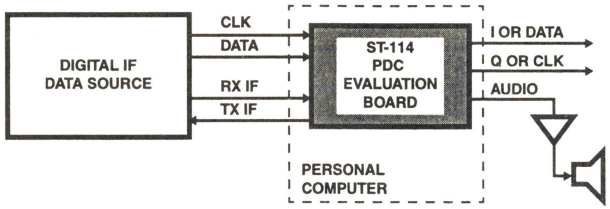
Here's what you order:

1ea HSP50110/210EVAL
1ea HI5703EV
2(opt) HI5721EV

Here's what else you need:

BIT ERROR RATE TESTER
MODULATED IF SOURCE
(opt) OSCILLOSCOPE
(opt) AUDIO AMP/SPEAKER
PC TO HOST CONTROL SOFTWARE

FIGURE 1. FM/PSK DEMOD OR TUNER BREADBOARD



Here's what you order:
1ea ST-114

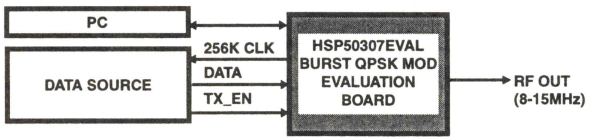
Here's what else you need:
486/PENTIUM PC
AUDIO AMP/SPEAKER

FIGURE 2. FM/DEMOD/QUADRATURE AM TUNER BREADBOARD

Here's what you order:
1ea HSPEVAL
1ea HSP45116DB
1ea HI5721EV (or 31 or 41)

Here's what else you need:
DATA SOURCE
PC TO HOST CONTROL SOFTWARE

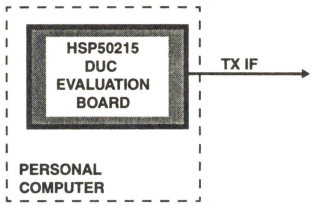
FIGURE 3. FSK/PM MODULATOR/SYNTHESIZER BREADBOARD



Here's what you order:
1ea HSP50307EV

Here's what else you need:
DATA SOURCE
PC TO HOST CONTROL SOFTWARE

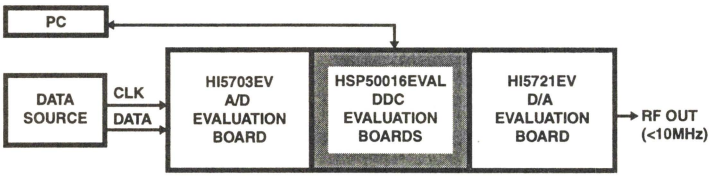
FIGURE 4. 256KBPS BURST QPSK MODULATOR/8-15MHz IF SYNTHESIZER BREADBOARD



Here's what you order:
1ea HSP50215EVAL

Here's what else you need:
386/486/PENTIUM PC

FIGURE 5. FM/SHAPED FM/QUADRATURE AM MOD/TUNER BREADBOARD



Here's what you order:
1ea HI5703EV
1ea HSP50016DB
1ea HI5721EV

Here's what else you need:
DATA SOURCE
PC TO HOST CONTROL SOFTWARE

FIGURE 6. FSK/PM MODULATOR/SYNTHESIZER BREADBOARD

A/D CONVERTER EVALUATION BOARD COMPATIBILITY WITH DSP EVALUATION BOARDS

EVAL BOARD	HI5703 (10-BIT)	HI5746 (10-BIT)	HI5762 DUAL (10-BIT)	HI5766 (10-BIT)	HI5767 (10-BIT)	HI5804 (12-BIT)	HI5805 (12-BIT)	HI5808 (12-BIT)	HI5905 (14-BIT)
HSPEVAL/45116EV	SPEC	UN/IN	IN	UN/IN	IN	SPEC	SPEC	UN	XX
HSP50110/210EVAL	SPEC	UN/IN	IN	UN/IN	IN	SPEC	SPEC	UN	XX
HSP50016EV	SPEC	UN/IN	IN	UN/IN	IN	SPEC	SPEC	UN	XX
ST-114	INCL	INCL	INCL	INCL	INCL	CA	CA	UN/CA	CA

NOTES:

1. XX indicates the evaluation board connectors are fully pin compatible and require only jumper configurations to effect proper operation.
2. UN indicates that current A/D evaluation kits are shipped with the connector uninstalled to allow the customer to install the proper sex connector.
3. IN indicates that the connector is installed on the far side of the A/D board to effect compatibility.
4. CA indicates a cable is required from the A/D 96 pin connector to an onboard jumper/header.
5. SPEC indicates the customer should specify that a female connector is desired when ordering the A/D evaluation board.
6. INCL indicates that a 10-bit HI5703 is included on the board, but a header is provided if another device is desired.
7. The bits are matched from MSB down in cases where the number of bits on the A/D and DSP board are different.

D/A CONVERTER EVALUATION BOARD COMPATIBILITY WITH DSP EVALUATION BOARDS

EVAL BOARD	HI5721 (10-BIT)	HI5731 (12-BIT)	HI5741 (14-BIT)	HI5760 (10-BIT)	HI5735 (12-BIT)
HSPEVAL/45116EV	XX	XX	XX	XX	XX
HSP50215EV	CA	CA	INCL	CA	CA

NOTES:

1. XX indicates the evaluation board connectors are fully pin compatible and require only jumper configurations to effect proper operation.
2. CA indicates a cable is required from the D/A 96 pin connector to an onboard jumper/header.
3. INCL indicates that a 14-bit HI5741 is included on the board, but a header is provided if another device is desired.
4. The bits are matched from MSB down in cases where the number of bits on the D/A and DSP board are different.

SIGNAL SYNTHESIS/MODULATION

PART #	FUNCTIONAL DESCRIPTION	MODULATION FORMATS	INPUT RATE (MSPS)	INPUT DATA (BITS)	SPECTRAL PURITY (dBc)	FREQUENCY RESOLUTION (Hz)	OUTPUT	FILTERING	PACKAGE TYPE	DOC #
HSP45102	NCO	QPSK, FSK	40	12	69	0.009 (32 Bits)	12 Bits, sin, 40MHz	None	28 Ld PDIC, 28 Ld SOIC	2810
HSP45106	NCO	FM, PM PSK, FSK	33	16	90	<0.008 (32 Bits)	16 Bits, sin/cos, 33MHz	None	84 Ld PLCC, 84 Ld CPGA	2809
HSP45116	NCO/Mixer	AM, FM, PM PSK, FSK, QAM	33	16	90	<0.008 (32 Bits)	16 Bits, I/Q, 33MHz	None	160 Ld MQFP 144 Ld CPGA	2485
HSP45116A	NCO/Mixer	AM, FM, PM PSK, FSK, QAM	52	16	90	<0.013 (32 Bits)	16 Bits, I/Q, 52MHz	None	160 Ld MQFP	4156
HSP50110	NCO/Mixer	BPSK,QPSK, QAM	52 MSPS	10	57	<0.013 (32 Bits)	10 Bits, I/Q, 52MHz	Compensation Sin (x)/(x)	84 Ld PLCC	3651
HSP50215	Shaping Filter/NCO/Mixer	ASK, m-ary PSK, FSK, QAM, MSK, FM	Up to 3.25 MSPS (Varies w/Filtering) 3.25 MSPS 4 Symbol Span 1.625 MSPS 8 Symbol Span	16	102 (NCO-Only) Varies with Interpolation Filter	<0.013 (32 Bits)	16 Bits, IF 52MHz	Programmable Shaping Interpolation	100 Ld MQFP	4346
HSP50307	Shaping Filter/NCO/Mixer	QPSK	256 Kbps	1	35	32kHz (Analog)	Analog IF	RRC $\alpha \approx 0.5$	28 Ld SOIC	4219

DIGITAL FILTER

PART #	FUNCTIONAL DESCRIPTION	MAX ATTENUATION (db)	(NOTE) COMPUTE RATE (TAPS/SEC)	FILTER TAPS	DATA BITS	COEFFICIENT (BITS)	DECIMATION	µP INTERFACE	PACKAGE TYPE	DOC #
HSP43168	FIR	60	720M	16 Up to 256 Dep. on Decimation	10	10 Programmable	1 to 16	Standard	84 Ld PLCC, 100 Ld MQFP, 85 Ld CPGA	2808
HSP43220	CIC, FIR	96	66M (FIR)	Up to 512	16	20 Programmable	up to 16,384	Standard	100 Ld MQFP, 85 Ld CPGA	2486

DIGITAL FILTER (Continued)

PART #	FUNCTIONAL DESCRIPTION	MAX ATTENUATION (db)	(NOTE) COMPUTE RATE (TAPS/SEC)	FILTER TAPS	DATA BITS	COEFFICIENT (BITS)	DECIMATION	µP INTERFACE	PACKAGE TYPE	DOC #
HSP43216	Halfband	90	3484M	67	16	20 Fixed	1/2, 2	Standard	84 Ld PLCC, 100 Ld MQFP, 85 Ld PGA	3365
HSP43124	Halfband, FIR	140	90M	Up to 256 (FIR)	24	32 Programmable	1 to 256	Standard	28 Ld PDIP, 28 Ld SOIC	3555

NOTE: COMPUTE RATE - This metric is designed to reflect the actual computing capability of a digital filter. Its defined as:

Compute Clock Rate x Number of Multipliers x Symmetry.

This metric normalizes the effect of decimation, since decimation increases the number of taps proportional to the reduction in compute clock rate.

For Example the HSP43124 Serial Filter runs at 45MHz, has 1 multiplier (Tap) and Even Symmetry (2).

Compute Rate = 45MHz x 1 Tap x 2 = 90M Taps/s.

The HSP43168 Dual FIR runs at 45MHz, has 8 Multipliers (Taps), and Even Symmetry = 2.

Compute Rate = 45MHz x 8 taps x 2 = 720M Taps/s.

The HSP43220 Digital Decimating Filter runs at 33MHz, has 1 Multiplier (Tap), and Even Symmetry = 2.

Compute Rate = 33MHz x 1 Tap x 2 = 66M Taps/s.

DOWN CONVERSION

PART NUMBER	FUNCTIONAL DESCRIPTION	CLOCK (MHz)	DATA (BITS) INPUT/ OUTPUT	DECIMATION FACTORS	FREQUENCY SELECTIVITY (Hz)	FILTERING	PACKAGE	DOC #
HSP50016	NCO/Mixer/Filter	75 (Note 2)	16	64-131,072	<0.009 32 Bits	CIC (Note)	44 Ld PLCC, 48 Ld CPGA	3288
HSP50110	NCO/Mixer/Filter/ACG/Re-Sampler	52 (Note 2)	10 (Real or Complex)	1-4096	<0.013 32 Bits	Third Order CIC, Compensation	84 Ld PLCC	3651
HSP50214	NCO/Mixer/CIC/HB/FIR/Re-Sampler/ACG/Coordinate Converter Discriminator	52MHz CLKIN, (Note 2) 35MHz PROCCLK (back end)	14 (Real)	4-16,384	<0.013 32 Bits	Fixed CIC, Fixed Halfband, Programmable FIR, Fixed Re-Sampler	120 Ld MQFP	4266
HSP50214A HSP50214B	NCO/Mixer/RIC/HB/FIR/Re-Sampler/ACG/Coordinate Converter Discriminator	65MHz CLKIN, (Note 2) 52MHz PROCCLK (back end)	14 (Real)	4-16,384	<0.013 32 Bits	Fixed CIC, Fixed Halfband, Programmable FIR, Fixed Re-Sampler	120 Ld MQFP	4266

NOTE:

1. CIC is a Cascaded Integrator Comb Filter.
2. Equals input sample rate.

DEMODULATION

PART NUMBER	FUNCTIONAL DESCRIPTION	MODULATION FORMATS	INPUT SAMPLE RATES (MSPS)	DATA (BITS)	DECIMATION FACTORS	FREQUENCY SELECTIVITY (Hz)	AUTOMATIC GAIN CONTROL	OUPUT FORMAT	FILTERING	CARRIER/ SYMBOL TRACKING	DOC #
HSP50110, HSP50210	SATCOM Modem Chip Set	BPSK, QPSK, OQPSK, 8-PSK	52	10 (Real or Complex)	2-131-72	<0.013 (32 Bits)	Yes	I,Q, Isoft, QSoft	RRC ($\alpha \approx 0.4$) or Integrate and Dump	Yes Programmable B_L, ζ Yes Programmable B_L, ζ	3651, 3652
HSP50210	Digital Costas Loop	BPSK, QPSK, OQPSK, 8-PSK	52	10 (Real or Complex)	2-32 2 RRC 2/4/8/16/32	<0.013 (32 Bits)	Yes	I, Q, θ, Irl, Isoft, QSoft	RRC or I&D	Yes Programmable B_L, ζ Yes Programmable B_L, ζ	3652
HSP50306	Cable Digital QPSK Demodulator	QPSK	12.8, 13.485 (CLK = $2F_S$)	6 (Real)	Fixed	<0.125 Fixed	Level Detection for use with External AGC	Multplexed I, Q	RCC ($\alpha \approx 0.4$) Plus 4 Tap Adaptive Equalizer	Yes 10KHz B_L for 10.7MHz IF Yes 3KHz B_L for 2.048Mbps Data Rate	4162
HSP50214, HSP50210	Modem Chip Set	BPSK, QPSK, OQPSK, 8-PSK, FM, AM	52 CLKIN 35MHz PROCLK (52MHz PROCLK)	14 (Real)	4-524,288	<0.013 (32 Bits)	Yes	I, Q, θ, Irl, f, Isoft, QSoft	Fixed CIC (Note), Fixed Halfband, Programmable FIR, Fixed Re-Sampler/ Interpoletes/I&D RRC ($\alpha = 0.4$)	Yes Programmable B_L, ζ Yes Programmable B_L, ζ	4266, 3652

NOTE: CIC is a Cascaded Integrator Comb Filter.

SPECIAL FUNCTION

PART NUMBER	FUNCTIONAL DESCRIPTION	CLOCK (MHz)	SIZE (BITES)	MULTIPLY TIME (ns)	RESULT (BITS)	CORRELATION ARRAY	µP INTERFACE	PACKAGE TYPES	DOC #
HSP45256	Configurable Binary Correlator	33	1, 2, 4, 8	-	-	up to 256 Taps	Standard	84 Ld PLCC, 85 Ld CPGA	2814
HSP9501	Programmable Data Buffer	32	10, 2-1281	-	10	-	Standard	44 Ld PLCC	2786
HMA510	Parallel Multiplier Accumulator	-	16 x 16	45	35	-	-	68 Ld PLCC, 68 Ld CPGA	2806
HMU16, HMU17	Parallel Multiplier	-	16 x 16	35	32	-	-	68 Ld PLCC, 68 Ld CPGA	2803

DSP Package Selection Guide

Using the Selection Guide:

The first character of each entry indicates the package type, while the number preceding the decimal point details the package lead count. Except for CPGA and TAB packages, the decimal point and succeeding numbers relate to the package body dimensions (e.g. __.14 x 20 = 14mm x 20mm; __.95 = 950 mil sq.; __.3 = 300 mils.

PART NUMBER	MQFP	PLCC	SOIC	PDIP	CPGA
HMA510		N68.95			G68.A
HMA510/883					G68.A
HMU16		N68.95			G68.A
HMU16/883					G68.A
HMU17		N68.95			G68.A
HMU17/883					G68.A
HSP43124			M28.3	E28.6	
HSP43168	Q100.14x20	N84.1.15			G84.A
HSP43168/883					G84.A
HSP43216	Q100.14x20	N84.1.15			G85.A
HSP43220	Q100.14x20	N84.1.15			G84.A
HSP43220/883					G84.A
HSP43881		N84.1.15			G85.A
HSP43881/883					G85.A
HSP43891	Q100.14x20	N84.1.15			G85.A
HSP43891/883					G85.A
HSP45102			M28.3	E28.6	
HSP45106		N84.1.15			G85.A
HSP45106/883					G85.A
HSP45116	Q160.28x28				G145.A
HSP45116A	Q160.28x28				
HSP45116/883					G145.A
HSP45240		N68.95			G68.A
HSP45240/883					G68.A
HSP45256		N84.1.15			G85.A
HSP45256/883					G85.A
HSP48212	Q64.14x14	N68.95			
HSP48410		N84.1.15			G84.A
HSP48410/883					G84.A
HSP48901		N68.95			G68.A
HSP48908	Q100.14x20	N84.1.15			G84.A
HSP48908/883					G84.A
HSP50016		N44.65			G48.A
HSP50110		N84.1.15			
HSP50210		N84.1.15			
HSP50214	Q120.28x28				
HSP50215	Q100.14x20				
HSP50306			M16.3		
HSP50307			M28.3		
HSP9501		N44.65			
HSP9520			M24.3	E24.3	
HSP9521			M24.3	E24.3	

Package information is available in Section 16.

Check our world wide web site for the most current documentation.

TELECOM 6

PRODUCT SELECTION GUIDE

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Telecom Ordering Nomenclature

HX "OLD" TYPES

H A 1 - 5134 -2

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
D: Digital
I: Interface
M: Memory
V: Analog High Voltage

PACKAGE DESIGNATOR
1: Ceramic Dual-In-Line Frit-Seal (CERDIP)
1B: Ceramic Dual-In-Line Metal-Seal (SBDIP)
2: Can
3: Dual-In-Line Plastic (PDIP)
4: Ceramic Leadless Chip Carriers (CLCC)
4P: Plastic Leaded Chip Carrier (PLCC)
6: Narrow Dual-In-Line Plastic (PDIP) or Ceramic Dual-In-Line Frit-Seal (CERDIP)
7: 8 Lead Ceramic Dual-In-Line Frit-Seal (CERDIP)
9P: Small Outline Plastic (SOIC)
0: Chip

NOTE: If the package designator is 2 characters the hyphen is omitted from the part number.

PART NUMBER

PERFORMANCE GRADE
A, B: High Performance
C: Relaxed Specification
S: Very High Speed

NOTE: Applies to HA, HD and HM products only.

TEMPERATURE GRADE
-2: -55°C to 125°C
-4: -25°C to 85°C
-5: 0°C to 75°C
-6: 25°C Chip Probe
-7: Dash-7 High Reliability Commercial Product 0°C to 75°C, includes 96 hour Burn-In
-8: -55°C to 125°C Harris Class B Equivalent Devices for use in Military and Flight Systems
-9: -40°C to 85°C
/883: Fully Compliant to MIL-STD-883, Class B/QML
BXXXX: Customer Specific Screening
RXXXX: Customer Specific Screening
SXXXX: Customer Specific Screening

SUFFIX
96: Tape and Reel Option for SOIC, PLCC
X96: Tape and Reel Option for SOIC, PLCC

HX, HXX "NEW" TYPES

H A 4314B C B 96

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
FA: Ultra-High Frequency Analog
I: Data Acquisition
IN: Interface
V: Analog High Voltage

PART NUMBER

TEMPERATURE
C: 0°C to 70°C
I: -40°C to 85°C
M: -55°C to 125°C

PACKAGE DESIGNATOR
A: Shrink Small Outline Plastic (SSOP)
B: Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
H: Plastic Small Outline Transistor (SOT)
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
L: Ceramic Leadless Chip Carrier (CLCC)
M: Plastic Leaded Chip Carrier (PLCC)
N: Thin Quad Flatpack (TQFP), or Metric Quad Flatpack (MQFP)
Q: Metric Plastic Quad Flatpack (MQFP), or Plastic Quad Flatpack (PQFP)
P: Dual-In-Line Plastic (PDIP)
T: Can
Y: Chip (Commercial Visual)
W: Wafer

SUFFIX
/883: Fully Compliant to MIL-STD-883 Class B/QML
96: Tape and Reel
-T: Tape and Reel

CD22XXX TYPES

CD22 — Prefix Designation for Harris Telecom IC's

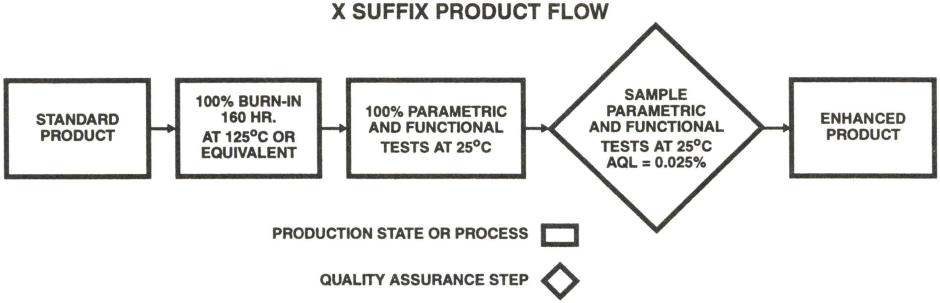
XXXXX — **PART NUMBER**

A — **REVISION**
A: 1st
B: 2nd etc.

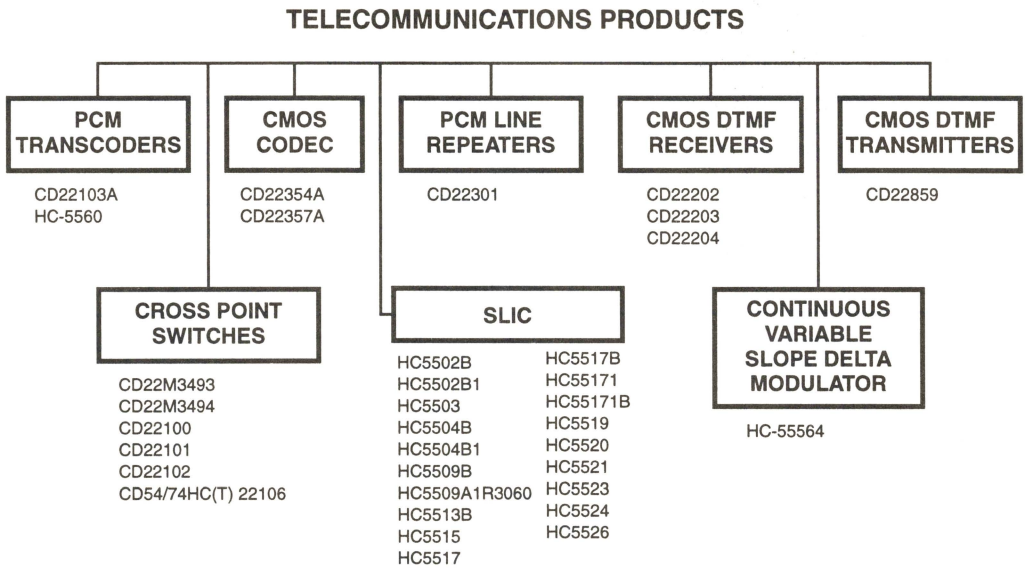
E — **PACKAGE DESIGNATOR**
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
E: Dual-In-Line Plastic (PDIP)
F: Ceramic Dual-In-Line Frit-Seal (CERDIP)
M: Small Outline Plastic (SOIC)
Q: Plastic Leaded Chip Carrier (PLCC)
H: Chip

X — **SCREENING OPTION**
X: Enhanced Product Screening i.e., Burn-In (Optional for D, E Package Types)

X SUFFIX PRODUCT FLOW



Telecommunications Product Selection Tree



Telecom Evaluation Boards

PART NUMBER	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	DOCUMENT #
HC5513, HC5526	HC5513EVAL, HC5526EVAL	HC5513, HC5526 SLIC, Evaluation Board HC5526, Low Cost PBX SLIC, Evaluation Board	AN9537
HC5517, HC55171	HC5517EVAL, HC55171EVAL	HC5517, HC55171 Ringing SLIC, Evaluation Board	AN9606
HC5515, HC5523	HC5515EVAL, HC5523EVAL	HC5515, CO/PBX SLIC, Evaluation Board HC5523, DLC/FITL SLIC, Evaluation Board	AN9632
HC55171B	HC55171BEVAL-TRAP1	HC55171B1 Trapezoidal Ring SLIC Evaluation Board	AN9775
HC5502B1	HC5502BEVAL, HC5502B1EVAL	HC5502B, HC5502B1 SLIC Evaluation Board	AN9753
SCC	HC5503EVAL	HC5503 SLIC Evaluation Board	AN9736
HC5504B, HC5504B1	HC5504BEVAL, HC5504B1EVAL	HC5504B, HC5504B1 Evaluation board	AN9751
HC5509B, HC5524	HC5509BEVAL, HC5524EVAL	HC5509B, HC5524 Evaluation Board	AN9729
HC5509A1R3060	HC5509A1R3060EVAL	HC5509A1R3060 Evaluation Board	AN9742

Telecommunications Selection Guide

ANALOG INTERFACE AT CENTRAL OFFICE OR PBX SWITCH END

- SLIC - Subscriber Line Interface Circuit
  - Interfaces Voice/Status Signals Between Residential Business Telephone and PBX/Central Office (CO) Switch
  - Every Telephone Requires a SLIC to Monitor It
  - Provides BORSHT Functions to Subscriber Loop
  - Monolithic Solution to Transformer Based Application
- CODEC - CODer/DECoder
  - Non-Linear Analog to Digital (Encode) and Digital to Analog (Decode) Converter for Voice
  - Converts Telephone Voice Signals, Via the SLIC, to/from Digital PCM Format for Transmission on Digital PCM Bus
  - Assigns Protocol for Timing Multiple Telephone Calls
- Crosspoint Switches
  - Matrix of Analog Switches with Digital Control to Interconnect Audio, Voice, Computer, PBX, Central Office Telephone Signals
- Surgectors
  - See Transient Voltage Suppression for Details
- Tone Receivers
  - Detects/Decodes Standard DTMF Sinusoidal Audio Tones for Call Routing By The Central Office Computer or for Subscriber End Instrument Control, i.e., Answering Machine, Fax

DIGITAL INTERFACE

- PCM Repeater - Pulse Code Modulation
  - Digital-Digital Converter for Signal Equalization, Pulse Shaping, Clock Extraction, Timing and Threshold Detection
  - For T1 (1.54MHz), T148 (2.37MHz), and CCITT (EUROPEAN 2.048MHz), Digital PCM Transmission Lines
- PCM Transcoders - Pulse Code Modulation
  - Converts Digital PCM Signal to Special Digital Codes to Maintain Signal Integrity Over Long Transmission Distances
  - For T1 (1.544MHz), T1C (3.152MHz), T2 (6.3212MHz) and CCITT (2.048MHz) "PCM HIGHWAY" Transmission Lines

ANALOG INTERFACE AT SUBSCRIBER END

- DTMF Circuits - Dual Tone Multi Frequency
- Tone Generator
  - Generates Standard DTMF Sinusoidal Audio Tones for the Standard Telephone Pushbutton Keypad

GENERAL INTERFACE

- CVSD - Continuously Variable Slope Deltamodulation
  - Analog-Digital (ENCODER) and Digital-Analog (DECODER) Converter for Voice
  - Converts Voice Signals to Serial Non-return to Zero (NRZ) Format and Vice Versa
  - Use in Telephone Systems, Radios and Secure Communications

ANALOG INTERFACE AT CENTRAL OFFICE SWITCH OR PBX SWITCH END

SLIC SUBSCRIBER LINE INTERFACE CIRCUITS							
	PART NUMBER						
DESCRIPTION	HC-5502B, HC-5502B1	HC5503	HC-5504B, HC-5504B1	HC-5524	HC-5509B	HC5513	HC5523
Status	Released	Released	Released	Released	Released	Released	Released
Replacement for	-	-	-	-	-	PBL3764/A	-
Application	PABX	PABX	PABX	PABX	Central Office	Central Office Loop Carrier	
Longitudinal Balance	58dB	53dB	58dB	58dB	58dB	55dB	58dB
Relay Drivers	Ring	Ring	Ring	Ring + 1	Ring + 1	Ring	Ring
Ringing Schemes	Ext.	Ext.	Ext.	Ext.	Ext.	Ext.	Ext.
High, Low Voltage Op.	-	-	-	X	-	X	X
Constant Voltage Feed	X	X	X	X	X	-	-
Constant Current Feed	-	-	-	-X	X	X	X
Programmable Feed	-	-	-	X	X	X	X
Loop Current (mA)	30	30	40	20 to 60	20 to 60	20 to 60	20 to 60
Rloop 20mA at 48V	1400	600 (at 246)	1400	1800	1800	2000	2000
Tip and Ring Open	-	-	-	X	X	X	X
Loop Current Detector	X	X	X	X	X	X	X
Ground Key Detector	X	-	X	X	X	X	X
Ring Trip Detector	X	X	X	X	X	X	X
Thermal Shutdown	-	-	-	X	X	X	X
Thermal Shutdown Detector	-	-	-	X	X	-	-
On Hook Transmission	X	X	X	X	X	X	X
Saturation Guard	X	X	X	X	X	X	X
-40°C to 85°C	X	-	X	X	X	X	X
Standard Packages	PDIP	-	PDIP	PDIP	PDIP	PDIP	PDIP
	PLCC	PLCC	PLCC	PLCC	PLCC	PLCC	PLCC
	SOIC	SOIC	SOIC	SOIC	SOIC	-	-
Document Number	2884/4127	4344	2886/4125	2798	2799	3963	4144

ANALOG INTERFACE AT CENTRAL OFFICE SWITCH OR PBX SWITCH END (Continued)

SLIC SUBSCRIBER LINE INTERFACE CIRCUITS							
	PART NUMBER						
DESCRIPTION	HC5526	HC5515	HC5517, HC55171	HC5517B, HC55171B	HC5519	HC5520	HC5521
Status	Released	Released	Released	Released	Sampling	Sampling	Sampling

ANALOG INTERFACE AT CENTRAL OFFICE SWITCH OR PBX SWITCH END (Continued)

SLIC SUBSCRIBER LINE INTERFACE CIRCUITS							
	PART NUMBER						
DESCRIPTION	HC5526	HC5515	HC5517, HC55171	HC5517B, HC55171B	HC5519	HC5520	HC5521
Replacement for	PBL3860 PBL3860A						
Application	Central Office Loop Carrier PABX		ISDN Modems Cable Telephony WLL	ISDN Modems Cable Telephony WLL	Central Office Includes Combo	Central Office	Central Office PABX
Longitudinal Balance	53dB	53dB	58dB	40dB	48dB	48dB	48dB
Relay Drivers	Ring	Ring	1	1	Ring + 2	Ring + 2	Ring + 2
Ringing Schemes	Ext.	Ext.	Ext.	Ext.	Ext.	Ext.	Ext.
High, Low Voltage Op.	X	X	X	X			
Constant Voltage Feed			X	X	X	X	X
Constant Current Feed	X	X					
Programmable Feed	X	X	X	X			
Loop Current (mA)	20 to 60	20 to 60	20 to 60	20 to 60	30	30	30
Rloop 20mA at 48V	2000	2000	Short Loop	Short Loop	1710	1710	1710
Tip and Ring Open	X	X	X	X	X	X	X
Loop Current Detector	X	X	X	X	X	X	X
Ground Key Detector	X						
Ring Trip Detector	X	X	X	X	X	X	X
Thermal Shutdown	X	X	X	X	X	X	X
Thermal Shutdown Detector			X	X	X	X	X
On Hook Transmission	X	X	X	X	X	X	X
Saturation Guard	X	X	X	X	X	X	X
On-Chip Transhybrid Bal.					X		
-40°C to 85°C	X	X	X	X			
Standard Packages	PDIP	PDIP	PLCC	PLCC	MQFP	MQFP	MQFP
	PLCC	PLCC	SOIC	SOIC		PLCC	PLCC
Document Number	4151	4235	4147, 4323	4404, 4422	4232	4148	4265

ANALOG INTERFACE AT CENTRAL OFFICE SWITCH OR PBX SWITCH END (Continued)

CROSSPOINT SWITCHES

TYPE	FEATURES	CONFIGU-RATION	R_{ON} TYP at 12V	Δ R_{ON} TYP at 12V	FREQ. RESPONCE TYP -3dB 14V	CROSSTALK TYP -40dB 14V	SUPPLY VOLTAGE	PACKAGE
BIMOS-E CROSSPOINT SWITCHES WITH CONTROL INPUT MEMORY								
CD22M3493 CD22M3494	• Independent Address Latches • Manual and Automatic Power-On Resets • Crosstalk: -90dB (Min) at 10kHz • Parallel Input Addressing • HC/HCT Ground-Referenced Inputs Available • 2kV Minimum ESD Protection • Latch-Up Current: 50mA Min • Pin and Functionally Compatible with the SGS M3493/M3494 and Mitel MT8812/MT8816	12 x 8 x 1 16 x 8 x 1	36Ω	6Ω	45MHz	3MHz	4V to 16V CD22M3493 4V to 15V CD22M3494	40 Lead PDIP (E), 44 Lead PLCC (N)
CMOS CROSSPOINT SWITCHES WITH CONTROL MEMORY								
CD22100	• "Built-In" Control Latches • Large Analog Signal Capability $\pm V_{DD}/2$ • 10MHz Switch Bandwidth • High Linearity - 0.5% Distortion Typ at f = 1kHz, $V_{IN} = 5V_{P-P}$, V_{DD} = 10V, and R_L = 1kΩ • Standard CMOS Noise Immunity • 100% Tested for Maximum Quiescent Current at 20V	4 x 4 x 1	75Ω	18Ω	40MHz	1.5MHz	3V to 18V	16 Lead PDIP (E), CERDIP (F)
CD22101	• Strobed Control Input • "Built-In" Latched Inputs • Large Analog Signal Capability $\pm V_{DD}/2$ • 10MHz Switch Bandwidth • High Linearity - 0.25% Distortion Typ at f = 1kHz, $V_{IN} = 5V_{P-P}$, $V_{DD} - V_{SS}$ = 10V, and R_L = 1kΩ • Standard CMOS Noise Immunity	4 x 4 x 2	75Ω	8Ω	40MHz	2.5MHz	3V to 18V	24 Lead PDIP (E), CERDIP (F)
CD22102	• Same as CD22101, but has Set/Reset Flip-Flop Control Input Instead of Strobed Control Input	4 x 4 x 2	75Ω	8Ω	40MHz	2.5MHz	3V to 18V	24 Lead PDIP (E), CERDIP (F)
CD74HC22106 CD74HCT22106	• 64 Analog Switches in an 8 x 8 x 1 Array • On-Chip Line Decoder and Control Latches • Automatic Power-Up Reset by Using a 0.1μF Capacitor at the MR Pin • R_{ON} Resistance 95Ω Max at V_{CC} = 4.5V • Analog Signal Capability $V_{DD}/2$	8 x 8 x 1	64Ω	25Ω	6MHz	7MHz	2V to 10V	28 Lead PDIP (E)

NOTE: High performance analog switches matrix for PBX, studio, audio switching, and multisystem bus interconnects.

ANALOG INTERFACE AT CENTRAL OFFICE SWITCH OR PBX SWITCH END (Continued)

CMOS CODECs COMPLEMENTARY METAL-OXIDE SEMICONDUCTOR				
PART NUMBER	**FEATURES**	**CLOCK RATES**	**SUPPLY VOLTAGE**	**PACKAGE**
NON-LINEAR ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTER FOR VOICE AND PCM (PULSE CODE MODULATION) SIGNALS				
CD22354A (μ-Law) CD22357A (A-Law)	• Meets or Exceeds All AT&T D3/D4 Specs CCITT Recommendations • Complete CODEC and Filtering Systems - No External Components for Sample-and-Hold and Auto-Zero - Receive Output Filter with SIN X/X Correction and Additional 8kHz Suppression • Variable Data Clocks - From 64kHz to 2.1MHz • Synchronous and Asynchronous Operation • TTL or CMOS Compatible Logic • ESD Protection on All Inputs and Outputs • Adjustable Gain for Transmit Input	64kHz to 2.1MHz	±5V ±5% at 90mW (Max)	16 Lead PDIP (E)

ANALOG INTERFACE AT SUBSCRIBER END

CMOS DTMF RECEIVERS				
TYPE	**FEATURES**	**OUTPUT 3-STATE OUTPUT CODE**	**SUPPLY VOLTAGE**	**PACKAGE**
CD22202	• Detects Either 12 or 16 Standard DTMF Signals • Central-Office Quality • No Front-End Band Splitting Filters Required • Single, Low-Tolerance, 5V Supply • Uses Inexpensive 3.579545MHz Crystal for Reference • Excellent Speech Immunity • Synchronous or Handshake Interface • Three-State Outputs	4-Bit Hexadecimal or Binary Coded 2-of-8	5V ±10%	18 Lead PDIP (E)
CD22203	• Same as CD22202, but also has Early Detect Output	4-Bit Hexadecimal or Binary Coded 2-of-8	5V ±10%	18 Lead PDIP (E)
CD22204	• No Front-End Band Splitting Filters Required • Single, Low-Tolerance, 5V Supply • Three-State Outputs for Microprocessor-Based Systems • Detects all 16 Standard DTMF Digits • Uses Inexpensive 3.579545MHz Crystal for Reference • Excellent Speech Immunity • Outputs in 4-Bit Hexadecimal Code	4-Bit Hexadecimal Only	5V ±10%	14 Lead PDIP (E), 24 Lead SOIC (M)

CMOS DTMF TRANSMITTERS				
TYPE	**FEATURES**	**OUTPUT (MIN)**	**SUPPLY VOLTAGE**	**PACKAGE**
CD22859	• Mute Drivers on Chip • Device Power Can Either be Regulated DC or Phone Loop Current • Use of an Inexpensive 3.579545MHz TV Crystal Provides High Accuracy and Stability for All Frequencies	350mV into 82Ω	2.5V to 10V	16 Lead PDIP (E)

NOTE: Detects and generates special tones for standard telephone touch tone dialing keypad.

DIGITAL INTERFACE

PCM LINE REPEATERS

TYPE	FEATURES	OUTPUT	SUPPLY VOLTAGE	PACKAGE
BIPOLAR				
CD22301	• Automatic Line Buildout • For T1 1.544Mbits/s Bipolar Carrier System • For T148 2.37Mbits/s Ternary Carrier System • For CCITT 2.048Mbits/s Bipolar Carrier System	Buffered	5.1V ±5%, 30mA Max	18 Lead PDIP (E)

NOTE: Digital to digital converter to bolster and reshape digital PCM signals distorted by long transmission over PCM bus lines.

PCM TRANSCODERS

TYPE	FEATURES	OUTPUT	CODES	SUPPLY VOLTAGE	PACKAGE
HC-5560	• Mode Selectable Coding • North American and European Compatibility • Simultaneous Encoding and Decoding • Asynchronous Operation • Loop-Back Control • Transmission Error Detection • Alarm Indication Signal • Replaces MJ1440, MJ1471, and TCM2201 Transcoders	3.2mA at 0.4V	AMI (T1 and T1C) B6ZS (T2) B8ZS (T1) HDB3 (PCM30)	5V at 10mA Typ	20 Lead PDIP (E)
CD22103A	• Simultaneous Encoding and Decoding • HDB3 Coding and Decoding for Data Rates from 50kbits/s to 10Mbits/s in a Manner Consistent with CCITT G703 Recommendations • HDB3/AMI Transmission Coding/Reception Decoding with Code Error Detection is Performed in Independent Coder and Decoder Sections • All Transmitter and Receiver Inputs/Outputs are TTL Compatible • Internal Loop Test Capability	1.6mA at 0.5V	HDB3/AMI per CCITT G703 Annex Recommendation	5V ±10% at 100mA Max	16 Lead PDIP (E)

NOTE: Unipolar to bipolar digital to digital converter for more efficient long line transmission of digital PCM signals.

GENERAL INTERFACE

CVSD
CONTINUOUS VARIABLE SLOPE DELTA MODULATOR

TYPE	FEATURES	CLOCK RATES	SUPPLY VOLTAGE	PACKAGE
HC-55564	• Modulator/Demodulator Functions • All Digital • Requires Few External Parts • Low Power Drain: 1.5mW Typical from Single 3V - 7V Supply • Time Constants Determined by Clock Frequency; No Calibration or Drift Problems; Automatic Offset Adjustment • Half Duplex Operation Under Digital Control • Filter Reset Under Digital Control • Automatic Overload Recovery • Automatic "Quiet" Pattern Generation • AGC Control Signal Available	9kHz to 64kHz	3.3V to 6V at 1.5mA Max	16 Lead SOIC (M), 14 Lead PDIP (E), CERDIP (F)

NOTE: A real time voice to digital (Encoder) and digital to voice (Decoder) converter.

Telecom Package Selection Guide

Using the Selection Guide:

The first character of each entry indicates the package type, while the number preceding the decimal point details the package lead count. Except for Can packages, the decimal point and succeeding numbers specify the package width in inches (e.g. __.15 = 150 mil width).

PART NUMBER	PDIP	MQFP	SOIC	PLCC	CDIP
CD22100	E16.3	-	-	-	F16.3
CD22101	E24.6	-	-	-	F24.6
CD22102	E24.6	-	-	-	F24.6
CD22103A	E16.3	-	-	-	-
CD22202	E18.3	-	-	-	-
CD22203	E18.3	-	-	-	-
CD22204	E14.3	-	M24.3	-	-
CD22301	E18.3	-	-	-	-
CD22354A	E16.3	-	-	-	-
CD22357A	E16.3	-	-	-	-
CD22859	E16.3	-	-	-	-
CD22M3493	E40.6	-	-	N44.65	-
CD22M3494	E40.6	-	-	N44.65	-
CD74HC22106, CD74HCT22106	E28.6	-	-	-	-
HC-5502B	E24.6	-	M24.3	N28.45	
HC-5502B1	E24.6	-	M24.3	N28.45	-
HC5503	-	-	M24.3	N28.45	-
HC-5504B	E24.6	-	M24.3	N28.45	-
HC-5504B1	E24.6	-	M24.3	N28.45	-
HC-5509B	E28.6	-	M28.3	N44.65	-
HC5513	E22.4	-	-	N28.45	-
HC5515	E22.4	-	-	N28.45	-
HC5517, HC5517B, HC55171, HC55171B	-	-	M28.3	N28.45	-
HC5523	E22.4	-	-	N28.45	-
HC-5524	E28.6	-	M28.3	N44.65	
HC5526	E22.4	-	-	N28.45	-
HC-55564	E14.3	-	M16.3	-	F14.3
HC-5560	E20.3	-	-	-	-

EXAMPLE: M 16 .15

PACKAGE TYPE — LEAD COUNT — BODY WIDTH

Packaging information is available in Section 16.

Check our world wide web site for the most current documentation.

INTELLIGENT POWER ICs 7

PRODUCT SELECTION GUIDE

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Intelligent Power Ordering Nomenclature

HIP TYPES

PART NUMBER

H I P 2 5 0 0 I P

PREFIX
H: Harris

FAMILY
IP: Intelligent Power
V: High Voltage

TOPOLOGY
0: Low Side Switch
1: High Side Switch
2: Half Bridge
3: Reserved for future use
4: Full Bridge
5: Regulator/Power Supply
6: PWM Controller
7: Multiplex Communication Circuit
8: Audio Specific Circuits
9: Special Function

VOLTAGE
Multiply by 10 for Capability
(i.e., 50 = 500V)

If Negative (-) is Used for First Digit, Do Not Multiply by 10
(i.e., -5 = 5V)

SEQUENTIAL NUMBER
Based on Order of Development 0-9

TEMPERATURE
A: Automotive (-40°C to 150°C)
C: Commercial (0°C to 70°C)
I: Industrial (-40°C to 85°C)
M: Military (-55°C to 125°C)
D: EDP (0°C to 85°C)

PACKAGE DESIGNATOR
B: Small Outline Plastic (SOIC)
D: Chip
M: Plastic Leaded Chip Carrier (PLCC)
P: Dual-In-Line Plastic (PDIP)
Q: Metric Plastic Quad Flatpack (MQFP)
S: Single-In-Line Plastic (SIP)
W: Wafer
Y: Die

ICL, ICM TYPES

ICL 8069D C B A T

DEVICE FAMILY
ICL
ICM

PART NUMBER

TEMPERATURE RANGE
C: Commercial, 0°C to 70°C
I: Industrial, -25°C to 85°C or -40°C to 85°C (Specified on Data Sheet)
M: Military, -55°C to 125°C

PACKAGE DESIGNATOR
B: Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
F: Ceramic Flatpack
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
M: Metric Plastic Quad Flatpack (MQFP)
P: Plastic Dual-In-Line
S: TO-52 Can
T: Can (TO-99, TO-100)
Z: TO-92 (Plastic)
/W: Wafer
/D: Chip

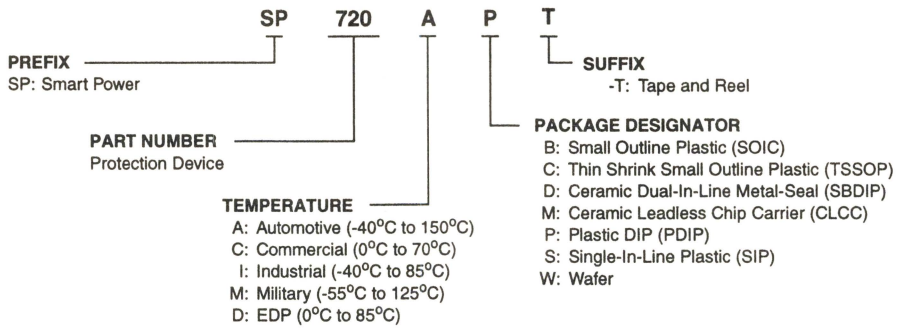
SUFFIX
/883B: Fully Compliant to MIL-STD-883 Class B/QML
T: Tape and Reel

PIN COUNT DESIGNATOR

SUFFIX	PIN COUNT	DIAMETER
A	8	
B	10	
C	12	
D	14	
E	16	
F	22	
G	24	
H	42	
I	28	
J	32	
K	35	
L	40	
N	18	
P	20	
Q	2	
R	3	
V	8	0.200″ pin circle, isolated case
W	10	0.230″ pin circle, isolated case
X	10	0.230″ pin circle, case to pin 5
Y	8	0.200″ pin circle, case to pin 4
Z	8	0.230″ pin circle, case to pin 5
44	44	

Intelligent Power Ordering Nomenclature

SP TYPES



Intelligent Power Product Selection Trees

INTEGRATED CIRCUITS

AC TO DC CONVERTERS

CA3059
CA3079
HIP5600
HV-2405E

CONSUMER PRODUCTS

CA1391
CA1394
CA2111A
CA3088
CA3089
CA3126
CA3154
CA3189
CA3224
HIP9021

POWER SUPPLY CIRCUITS

CA723
CA723C
CA1524
CA2524
CA3085
CA3277
CA3524
HIP2100
HIP5010
HIP5011
HIP5015
HIP5016
HIP5020
HIP5061
HIP5500
HIP5600
HIP6002
HIP6003
HIP6004
HIP6004A
HIP6005
HIP6005A
HIP6006
HIP6007
HIP6008
HIP6011
HIP6012
HIP6013
HIP6014
HIP6015
HIP6200
ICL7660
ICL7660A
ICL7660S
ICL7662
ICL7663S

VOLTAGE MONITORING CIRCUITS

HIP5600
ICL7665S
ICL7673
ICL8211
ICL8212

PROTECTION CIRCUITS

SP710
SP720
SP720MD
SP720MM
SP720MD-8
SP720MM-8
SP721
SP723

SPECIAL FUNCTIONS

CA3020
CA3020A
CA3094
CA3094A
CA3094B
CA3165E
CA3274
HIP2060
HIP9010AB
HIP9020AB
HIP9020AP

MULTIPLEXER COMBINATION CIRCUITS

CDP68HC68S1
HIP7010
HIP7020
HIP7030A0
HIP7030A2
HIP7038A8

DRIVER CIRCUITS

FET ARRAYS

HIP0061

HALF BRIDGE CIRCUITS

HIP2030
HIP2100
HIP2500
HIP5500
HV400
SP600
SP601

FULL BRIDGE CIRCUITS

CA3275
HIP4020
HIP4080
HIP4080A
HIP4081
HIP4081A
HIP4082

THREE PHASE DRIVER CIRCUITS

HIP4011
HIP4083
HIP4086

POWER SWITCHES

BIPOLAR LOW SIDE SWITCHES

CA3242
CA3252
CA3262
CA3262A
CA3272A
CA3292A

MOSFET LOW SIDE SWITCHES

CA3282
HIP0045
HIP0050
HIP0051
HIP0060
HIP0061
HIP0080
HIP0081
HIP0082

HIGH SIDE POWER SWITCHES

CA3273
HIP1030
HIP1031
HIP1090

HIGH SIDE MOSFET DRIVERS

HIP4083
HV400
ICL7667

FET DRIVERS

HIP0063
HIP9021
ICL7667

Intelligent Power Evaluation Boards

PART #	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	FEATURES	DOCUMENT #
HIP2030	HIP2030EVAL	HIP2030, 30V MCT/IGBT Gate Driver, Evaluation Board	• $3000V_{DC}$ Isolation • 10,000V/µS dv/dt Capability • Peak Output Current . . . . . 6.0A • Fast Rise Time. . . . . 200ns at 60,000pF • 120kHz Gate Switching . . C_{LOAD} at 15,000pF	3918
HIP2100	HIP2100EVAL2	HIP2100, 48V to 5V DC/DC Converter	• Two-Transistor Forward Converter • 36V to 72V Input, +5V Output • Surface-Mount • 500kHz	AN9605
HIP2100	HIP2100EVAL	HIP2100, 100V/2A Half Bridge Driver, General Purpose Design Tool	• Surface-Mount • IRFR120 Half-Bridge • Adaptable to Numerous Power Conversion Topologies	AN9531
HIP2500	HIP4082AEVAL	140W DC to AC Inverter Evaluation Board Using HIP4082 and HIP2500	• Two-Stage Inverter with 60kHz Isolation Transformer • $12V_{DC}$ to $120/220V_{AC}$ at 140W.	-
HIP4080	HIP4080AEVAL	HIP4080/HIP4081, 80V Full Bridge Driver Gen Purpose, Evaluation Board	• Breadboard Area • IRF520 H-Bridge • CD4069 Oscillator	AN9324
HIP4080A	HIP4080AEVAL	HIP4080/HIP4081, 80V Full Bridge Driver Gen Purpose, Evaluation Board	• Breadboard Area • IRF520 H-Bridge • CD4069 Oscillator	AN9404
HIP4080A	HIP4080AEVAL2	HIP4080A, Class D Audio Amplifier, Evaluation Board	• 150W Nominal Power Output • IMD Distortion at 0.03% • Frequency Response 20-20kHz at ±0.3dB • THD+N at <0.8% at 4W at 4Ω • Four-Pole Butterworth Filter Output	AN9525 4018
HIP4081	HIP4080AEVAL	HIP4080/HIP4081, 80V Full Bridge Driver Gen Purpose, Evaluation Board	• Breadboard Area • IRF520 H-Bridge • CD4069 Oscillator	AN9325
HIP4081A	HIP4080AEVAL	HIP4080/HIP4081, 80V Full Bridge Driver Gen Purpose, Evaluation Board	• Breadboard Area • IRF520 H-Bridge • CD4069 Oscillator	AN9405
HIP4082	HIP4082AEVAL	DC to AC Inverter, 140W Using HIP4082 and HIP2500 MOSFET Drivers and Other Harris ICs	• Two-Stage Inverter with 60kHz Isolation Transformer • $12V_{DC}$ to $120/220V_{AC}$ at 140W	-
HIP4083	HIP4083EVAL	HIP4083, 3-Phase High Side MOSFET Driver, Evaluation Board	• Breadboard Area • RFP22N10 H-Bridge • CD4049 Oscillator	-
HIP4086	HIP4086EVAL	HIP4086, 3-Phase MOSFET Driver, Evaluation Board	• Breadboard Area • RFP22N10 H-Bridge • CD4049 Oscillator	AN9642
HIP5011	HIP5011EVAL	HIP5011, Synch Rectifier Buck Regulator, SynchroFET Evaluation Board	• Output Current . . . . . 7A • Switching Frequency . . . . . 400kHz • Short Circuit Protection • High Efficiency. . . . . >87%	AN9526

Intelligent Power Evaluation Boards

PART #	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	FEATURES	DOCUMENT #
HIP5015	HIP5015EVAL2	HIP5015, DC-DC Converter for Powering High Performance Microprocessors	• Meets Intel Flexible Motherboard Guide • Two High Efficiency, 400kHz DX-DC Converters • Select Bit for Independent or Parallel Operation • 7A Total Load Current Capability, 5A maximum per Output	AN9625
HIP5020	HIP5020EVAL1	HIP5020, 7.5V - 12.6V Input; 3.3V, 3A Ouput, Evaluation Board	• Optimized for High Efficiency Peak . . . . . 92% Light Load . . . . . 88% • Operates at 200kHz • Provides 3.3V Output with ±0.3% Load Regulation • Size Area . . . . . $3.5in^2$ Height 0.45in	AN9643
HIP5020	HIP5020EVAL2	HIP5020, 5V - 12.6V Input; 3.3V, 3A Ouput, Evaluation Board	• Optimized for Small Size • Operates at 625kHz • Provides 3.3V Output with ±0.3% Load Regulation • Efficiency Peak . . . . . 89% Light Load . . . . . 84% • Size Area . . . . . $2.1in^2$ Height 0.24in	AN9670
HIP5600	HIP5600EVAL1	HIP5600, High Voltage DC-to-DC Converter, Evaluation Board	• $50V_{DC}$ to $450V_{DC}$ Input • Output Adjusted to $15V_{DC}$	3747
HIP5600	HIP5600EVAL2	HIP5600, 50V to 132V AC-to-DC Converter, Evaluation Board	• $50V_{AC}$ to $130V_{AC}$ Input • Output Adjusted to $15V_{DC}$	3748
HIP5600	HIP5600EVAL3	HIP5600, 5V to 280V AC-to-DC Converter, Evaluation Board	• 50V to $280V_{AC}$ Input • Output Adjusted to $15V_{AC}$	3749
HIP6002	HIP6002EVAL1	Embedded Pentium™ Pro Synchronous Buck Converter	• 5V or 12V Input • 2V to 3.5V Output • Up to 12A Output Current • OC, OV Protection	AN9668, 4270
HIP6003	HIP6003EVAL1	Pentium™ Pro VRM Buck Converter	• 5V or 12V Input • 2V to 3.5V Output • Up to 12A Output Current • OC, OV Protection	AN9664, 4274
HIP6004, HIP6004A (Note), HIP6014 (Note)	HIP6004EVAL1	Pentium™ II VRM Synchronous Buck Converter	• 5V or 12V Input • 1.3V to 3.5V Output • Up to 14A Output Current • OC, OV Protection	AN9672, 4275
HIP6004, HIP6004A (Note), HIP6014 (Note)	HIP6004EVAL3	Embedded Synchronous Buck Converter for Pentium™ II	• 5V or 12V Input • 1.3V to 3.5V Output • Up to 14A Output Current • OC, OV Protection	AN9706, 4275

Pentium™ II and Pentium™ Pro are trademarks of Intel Corporation.

Intelligent Power Evaluation Boards

PART #	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	FEATURES	DOCUMENT #
HIP6005, HIP6005A (Note), HIP6015 (Note)	HIP6005EVAL3	Embedded Buck Converter for Pentium™ II	• 5V or 12V Input • 1.3V to 3.5V Output • Up to 14A Output Current • OC, OV Protection	AN9706, 4276
HIP6006, HIP6012 (Note)	HIP6006EVAL1	DC-DC Converters for Microprocessors with Fixed Core Voltage Requirements	• 5V or 12V Input • Fixed 2.5V Output • Up to 9A Output Current • Overcurrent Protection	AN9722, AN9761, 4306
HIP6007, HIP6013 (Note)	HIP6007EVAL1	DC-DC Converters for Microprocessors with Fixed Core Voltage Requirements	• 5V or 12V Input • Fixed 2.5V Output • Up to 9A Output Current • Overcurrent Protection	AN9722, AN9761, 4307
HIP6200	HIP6200EVAL1	DeCAPitator™ Value Analysis Board - Reduce Bulk Capacitance Requirements	• 12V Input • 1.3 to 2.0V Output • BA Output Current • Two Seperate Output Stages with High di/dt Load Transients	AN9763
HIP7030	HIP7030ICE	J1850 8-Bit 68HC05 Microcontroller Development System	• Full Functionality at 10MHz Clock Frequency • 8K CMap • 8K x 32 Real Trace Memory • Built in Programmer for HIP7038A8 EEPROM	3645

NOTE: Due to pin-to-pin compatibility, these parts can be evaluated in the respective evaluation boards by replacing the resident IC with the separately ordered sample.

DeCAPitator™ is a trademark of Harris Corporation.

Intelligent Power Selection Guide

BIPOLAR LOW SIDE SWITCHES

BIPOLAR TYPES	CA3242 QUAD	CA3252 QUAD	CA3262 QUAD	CA3262A QUAD	CA3272A QUAD	CA3292A QUAD
Max Output Voltage, No Load	50V	50V	60V	60V	60V	32V Typ (Clamp)
Max Rated DC Load Current	0.6A	0.6A	0.7A	0.7A	0.6A	0.6A
Max V_{SAT} Output Voltage	0.8V at 0.6A	0.8V at 0.6A	0.6V at 0.6A	0.5V at 0.6A	0.4V at 0.5A	0.4V at 0.5A
Max Load Switching Voltage, V_{CESUS} or V_{CLAMP} Limited	35V	35V	40V	40V	40V	28V
Output Current Limiting and/or Shutdown Protection	1.4A (Latches-Off)	No	1.6A	1.3A	1.2A	1.2A
Output Thermal Limiting and/or Shutdown Protection (Temp. T_J)	No	No	155°C	155°C	165°C	165°C
Thermal Shutdown, Hysteresis	No	No	No	No	15°C	15°C
Fault Indicator Flag	No	No	No	No	Yes	Yes
Diagnostic Feedback	No	No	No	No	No	No
Temperature Range -40°C to ___°C	105	105	85	125	125	125
Package	16 PDIP	16 PDIP and 20 SOIC	16 PDIP	16 PDIP and 28 PLCC	28 PLCC	28 PLCC

BIMOS LOW SIDE SWITCHES

MOSFET TYPES	CA3282 OCTAL	HIP0045 OCTAL	HIP0050 OCTAL	HIP0051 OCTAL	HIP0060 QUAD	HIP0080 QUAD	HIP0081 QUAD	HIP0082 QUAD
Power Suppply Voltage Range	4.5V to 5.5V	4.5V to 5.5V	4.5V to 5.5V	4.5V to 5.5V	4.5V to 5.5V	5.5V to 25V	5.5V to 25V	4.5V to 5.5V
Power Supply Current	7.5mA	5mA, Max	2mA	100mA	10mA, Max	20mA	20mA	20mA
Max $r_{DS(ON)}$ Output Resistance	1.0Ω at 0.5A	1.5Ω at 0.5A	3.5Ω at 0.2A	3.5Ω at 0.2A	0.8Ω at 0.5A	1.0Ω at 0.5A	0.5Ω at 1A	0.57Ω at 2A
Min Output VoltageOver Clamp	27V	45V	42V	42V	40V	27V	73V	72V
Max Rated DC Load Current	1A	1A	0.5A	0.25A	1.5A	1A	2A	2A and 5A
Output Current Limiting and/or Shutdown Protection	1.5A (Limits)	1.4A 2 of 8 Limits, 6 of 8 Latch Off	0.5A (Latches-Off)	No	2.2A (Limits) 1.5 - 3.5A	1.8A (Latches-Off)	3.5A (Latches-Off)	2.7A and 5.7A (Latches-Off)
Output Thermal Limiting and/or Shutdown Protection, T_J	No	2 of 8 at 165°C Latch Off	155°C (Latches-Off)	No	165°C	150°C	150°C	165°C (Flag)
Thermal Shutdown, Hysteresis	No	-	10°C	-	15°C	15°C	15°C	-
Fault Indicator Flag	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Input Control and Diagnostic Interface/Feedback	SPI Bus Controlled Inputs and SPI Bus Diag. Interface	2 of 8 Inputs Direct with SPI control to All 8. Diag. SPI Bus Interface	SPI Bus Inputs and Fault Flag Output	-	Direct Input and SPI Bus Diag. Interface	Direct Input and Diag. SPI Compatible Interface	Direct Input and Diag. SPI Compatible Interface	Direct Input and Diag. SPI Compatible Interface
Temperature Range -40°C to ___°C	125	125	85	85	125	125	125	125
Package	15 SIP	20 PSOP	20 PDIP 24 SOIC	20 SOIC	24 SOIC	28 PLCC	15 SIP	15 SIP 20 PSOP

HALF BRIDGE MOSFET DRIVER CIRCUITS

TYPE	FUNCTION	MAX BUS (V)	RECOMMENDED SUPPLY VOLTAGE	MAX PULSED GATE CURRENT	MAX PWM FREQUENCY	SHOOT THRU PROTECTION	PACKAGE	RECOMMENDED APPLICATION
HIP2030	P-Channel Power Driver	$30V_{DC}$	$8V_{DC}$ to $15V_{DC}$	6A	180kHz	Yes	28 Lead PLCC	Motor Control
HIP2100	N-Channel Half Bridge	$100V_{DC}$	$9V_{DC}$ to $16.5V_{DC}$	2A	1MHz	Yes	8 Lead SOIC	DC-DC Converters
HIP2500	N-Channel Half Bridge	$500V_{DC}$	$10V_{DC}$ to $15V_{DC}$	2A	400kHz	No	14 Lead PDIP 16 Lead PDIP Wafer, Die 16 Lead SOIC	Motor Control SMPS
HIP5500	N-Channel Half Bridge	$500V_{DC}$	$10V_{DC}$ to $15V_{DC}$	2.3A	300kHz	Yes	20 Lead PDIP 20 Lead SOIC	SMPS
SP600	N-Channel Half Bridge	$500V_{DC}$	$14.5V_{DC}$ to $16.5V_{DC}$	0.5A	20kHz	Yes	22 Lead PDIP	Motor Control
SP601	N-Channel Half Bridge	$500V_{DC}$	$14.5V_{DC}$ to $16.5V_{DC}$	0.5A	20kHz	Yes	22 Lead PDIP	Motor Control
HIGH SIDE DRIVERS THAT CAN BE USED IN HALF BRIDGE CONFIGURATION								
HV400	N-Channel Power Driver	$35V_{DC}$	$15V_{DC}$ to $30V_{DC}$	6A (ON) Source 30A(OFF) Sink	20kHz(MC) 200kHz (SMPS)	N/A	8 Lead PDIP 8 Lead SOIC	Motor Control SMPS
ICL7667	N-Channel Dual Driver	$15V_{DC}$	$4.5V_{DC}$ to $15V_{DC}$	1.5A	100kHz	No	TO-99, PDIP, CERDIP and SOIC	Motor Control SMPS, and MOSFET Driver

HIGH SIDE PROTECTED POWER SWITCHES

TYPE	FUNCTION	MAX SUPPLY	DC SUPPLY RANGE	PEAK MAX CURRENT	DC MAX CURRENT	PACKAGE	RECOMMENDED APPLICATIONS
CA3273	Single Power	40V	4V to 24V	1.2A	0.6A	3 Lead Mod. TO-202	Solenoid, Relay, Lamp and Motor
HIP1030	Single Power	38V	4.5V to 25V	2.5A	1.1A	5 Lead TS-001AA	Solenoid, Relay, Lamp and Motor
HIP1031	Single Power	35V	4.5V to 25V	1.7A	0.7A	5 Lead TS-001AA	Solenoid, Relay, Lamp and Motor
HIP1090	Single Power	±90V, 15ms	4V to 16V	2A	1A	3 Lead TO-220	Solenoid, Relay, Lamp and Motor

HIGH SIDE MOSFET DRIVERS

TYPE	FUNCTION	MAX SUPPLY	DC SUPPLY RANGE	PEAK MAX CURRENT	MAX FREQUENCY	PACKAGE	RECOMMENDED APPLICATIONS
HIP4083	3-Phase	$80V_{DC}$	7V to 15V	400mA Peak (Turn-On) 550mA (Turn-Off)	200kHz	16 Lead PDIP and SOIC	Motor Control High Side FET Driver, Brushless, Switch Reluctance and AC Motors
HV400	Single High Speed	$35V_{DC}$	15V to 30V	6A (Source) 30A Sink (Pulsed)	20kHz (MC) 200kHz (SMPS)	8 Lead PDIP and SOIC	SMPS, FET Drivers, and Motor Controllers
ICL7667	Dual Power	15V	4.5V to 15V	1.5A (Pulsed Gate)	200kHz	8 Lead TO-99, PDIP, CERDIP, and SOIC	SMPS, FET Drivers, and Motor Controllers

AC TO DC CONVERTER

DEVICE	DESCRIPTION	AC INPUT VOLTAGE AT 50-60Hz AND 400Hz (V_{AC})	MAX DC SUPPLY VOLTAGE (V)	MAX OUTPUT CURRENT (mA)	SENSOR RANGE (RX) (KΩ)	FEATURES
CA3059	Zero Voltage Switch AC Power Control System on a Chip	24V 120V 208/230V 277V	14	124	2 to 100	Contains, Power Supply Zero Crossing Detector, External Sensor Comparator and Triac Driver. (Inhibit and Protection Circuits on CA3059 only)
CA3079			10	124	2 to 50	
HV-2405E	World Wide Single Chip Power Supply	15V to 275V	Output 5V to 24V	50	-	UL Recognized E130808
HIP5600	High Voltage Linear Regulator	50V to 280V	Output 1.2V to 350V	40	-	Thermal Protection

NOTE:

1. Electrical Characteristics at $T_A = 25^oC$, 14 Lead Dual-In-Line (E) Package Operating Temperature Range (T_A) -55^oC to 125^oC.

FULL BRIDGE

PART NUMBER	DESCRIPTION	PEAK OUTPUT CURRENT EACH DRIVE	SUPPLY VOLTAGE BIAS/BUS	NO LOAD MAXIMUM SUPPLY CURRENT	TARGETED APPLICATIONS
CA3275	Dual Full Bridge Driver	150mA	8V to 15V	20mA	Instrumentation
HIP4020	Low Voltage Motor Drive Power Full Bridge Driver	0.5A	2.5V to 15V	1.5mA	3V - 10V Motors 3V, 5V and 12V
HIP4080	Full Bridge FET Driver With Comparator, High Performance	2.5A	Bias: 8V to 16V Bus: 1V to 80V	18mA	Class D Amplifier, Voice Coil, Motor Control
HIP4080A	Full Bridge FET Driver U/V, Comparator with Start-up Circuitry	2.5A	Bias: 9.5V to 16V Bus: 1V to 80V	18.5mA	Class D Amplifier, Voice Coil, Motor Control
HIP4081	Full Bridge FET Driver, High Performance, Independent FET Control	2.5A	Bias: 6V to 16V Bus: 1V to 80V	16mA	DC-DC Converters, Motor Control, UPS Class D Amplifier
HIP4081A	Full Bridge FET Driver With U/V, High Performance with Start-up Circuitry, Independent FET Control	2.5A	Bias: 9.5V to 16V Bus: 1V to 80V	16.5mA	DC-DC Converters, Motor Control, UPS Class D Amplifier

FULL BRIDGE (Continued)

PART NUMBER	DESCRIPTION	PEAK OUTPUT CURRENT EACH DRIVE	SUPPLY VOLTAGE BIAS/BUS	NO LOAD MAXIMUM SUPPLY CURRENT	TARGETED APPLICATIONS
HIP4082	Full Bridge FET Driver With U/V, 20kHz-200kHz, Independent FET Control	1.25A	Bias: 8.5V to 15V Bus: 1V to 80V	6.6mA	UPS, Motor Control Class D Amplifier
HIP4086	Three Phase FET Driver with U/V Lockout, Charge Pump and Independent FET Control	1.25A	Bias: 7V to 15V Bus: 1V to 80V	10mA	Switch Reluctance Motors, Brushless Motors, AC Motors, Battery Powered Motors

POWER SUPPLY CIRCUITS

DEVICE	DESCRIPTION	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE RANGE	MAXIMUM OUTPUT CURRENT	SWITCHING FREQUENCY	SUPPLY CURRENT	TEMP. RANGE
CA723	Linear Voltage Regulators	9.5V to 40V	2V to 37V	150mA	-	3.5mA	-55°C to 125°C
CA723C						4.0mA	0°C to 70°C
CA1524	Pulse Width Modulators	8V to 40V	4.8V to 5.2V (Note 1)	100mA Max Rating for Each Output Driver	1kHz to 300kHz	10mA	-55°C to 125°C
CA2524			4.8V to 5.2V (Note 1)				0°C to 70°C
CA3524			4.6V to 5.4V (Note 1)				0°C to 70°C
CA3085	Linear Voltage Regulators	7.5V to 30V	1.8V to 26V	12mA to 100mA	-	4.5mA at V_{IN} = 30V	-55°C to 125°C
CA3085A		7.5V to 40V	1.7V to 36V	12mA to 100mA		5.0mA at V_{IN} = 40V	
CA3085B		7.5V to 50V	1.7V to 46V	12mA to 100mA		7.0mA at V_{IN} = 50V	
CA3277	Microprocessor Interface Controller Dual-Fixed 5V Regulator, Over-voltage Shutdown, Thermal Shut-down, Current Limited	6.2V to 18V	Output 1 - Full Time 5V ±0.25V Output 2 - Switched 5V ±0.25V	Output 1 - 100mA Output 2 - 100mA	-	500µA	-40°C to 85°C
HIP5010, HIP5011	Synchronous Buck Converter	0V to 5.5	≤4V	17A	>1MHz	100µA	-40°C to 85°C
HIP5015, HIP5016	Synchronous Buck Converter	0V to 5.5	≤4V	7A	50kHz to >1MHz	100µA	-40°C to 85°C
HIP5061	7A Current Mode PWM Regulator - TO220 Type Package	10.8V Min 14V Zener	Determined by External Circuitry	Power DMOS Transistor 60V-7A	250kHz	24-31mA	0°C to 85°C Therm. Protect.
HIP5020	Fully Integrated Synchronous Buck Controller	4.5V to 18V	1.3V to 5V	3.5A	100kHz to 1MHz	<20µA	0°C to 70°C
HIP5500	Half Bridge Power Supply Regulator	10V to 15V	500V Peak	2.3A Peak	30kHz to 300kHz	7mA	-40°C to 150°C
HIP5600	High Voltage Linear Regulator AC or DC Input	50V to 400V	1.2V to 350V	30mA	-	65µA	-40°C to 100°C Therm. Protect.

POWER SUPPLY CIRCUITS (Continued)

DEVICE	DESCRIPTION	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE RANGE	MAXIMUM OUTPUT CURRENT	SWITCHING FREQUENCY	SUPPLY CURRENT	TEMP. RANGE
HIP6002	Synchronous Buck PWM with 4-Bit DAC	12V ±10%	2V to 3.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6003	Buck PWM with 4-Bit DAC	12V ±10%	2V to 3.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6004	Synchronous Buck PWM with 5-Bit DAC	12V ±10%	1.3V to 3.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6004A	Synchronous Buck PWM Controller and Output Voltage Monitor	12V ±10%	1.8V to 3.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6005	Buck PWM with 5-Bit DAC	12V ±10%	1.3V to 3.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6005A	Buck PWM Controller and Output Voltage Monitor	12V ±10%	1.8V to 3.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6006	Synchronous Buck PWM Controller	12V ±10%	>1.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6007	Buck PWM Controller	12V ±10%	>1.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6008	Buck Pulse-Width Modulator PWM Controller and Output Voltage Monitor	12V ±10%	2.0 to 3.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6011	Buck PWM Controller and Output Voltage Monitor	12V ±10%	>1.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6012	Synchronous Buck PWM Controller	12V ±10%	>1.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6013	Buck PWM Controller	12V ±10%	>1.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6014	Synchronous Buck PWM Controller and Output Voltage Monitor	12V ±10%	1.8V to 3.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6015	Buck PWM Controller and Output Voltage Monitor	12V ±10%	1.8V to 3.5V	0.5A Typical for Each Output Driver	50kHz to 1MHz	5mA	0°C to 70°C
HIP6200	Transient Voltage Regulator	5V ± 10%	1.3V to 2.0V	8A	-	300µA	0°C to 70°C
ICL7660AI	Voltage Converter (Charge Pump)	1.5V to 12V	-1.5V to 22.8V	45mA	10kHz	165µA	-40°C to 85°C

POWER SUPPLY CIRCUITS (Continued)

DEVICE	DESCRIPTION	INPUT VOLTAGE RANGE	OUTPUT VOLTAGE RANGE	MAXIMUM OUTPUT CURRENT	SWITCHING FREQUENCY	SUPPLY CURRENT	TEMP. RANGE
ICL7660AC	Voltage Converter (Charge Pump)	1.5V to 12V	-1.5V to 22.8V	45mA	10kHz	165µA	0°C to 70°C
ICL7660C	Voltage Converter (Charge Pump)	1.5V to 10V	-1.5V to 18.6V	45mA	10kHz	500µA	0°C to 70°C
ICL7660M	Voltage Converter (Charge Pump)	1.5V to 10V	-1.5V to 18.6V	45mA	10kHz	500µA	-55°C to 125°C
ICL7660SM	Super Voltage Converter (Charge Pump Type)	1.5V to 12V	-1.5V to ±22.8V	45mA	10kHz to 35kHz	200µA	-55°C to 125°C
ICL7660SI						180µA	-40°C to 85°C
ICL7660SC						180µA	0°C to 70°C
ICL7662M	Voltage Converter (Charge Pump Type)	4.5V to 20V	-4.5V to +38.6V	90mA	10kHz	250µA	-55°C to 125°C
ICL7662C						200µA	0°C to 70°C
ICL7662I						200µA	-40°C to 85°C
ICL7663SAI	Linear Voltage Regulators	1.6V to 16V	1.3V to 16V	40mA - V_{OUT2} R_{ON} - 100Ω - V_{OUT2}	-	10µA	-25°C to 85°C
ICL7663S						12µA	0°C to 70°C

VOLTAGE MONITORING CIRCUITS

DEVICE	DESCRIPTION	VOLTAGE RANGE	QUIESCENT CURRENT	OUTPUT CURRENT	INPUT TRIP VOLTAGE	TEMPERATURE RANGE
ICL7665SAI	CMOS Micropower Over/ Under Voltage Detector	1.8V to 16V	10µA	2mA	1.3 ±2%	-40°C to 85°C
ICL7665SAC					1.3 ±8%	0°C to 70°C
ICL7673I	Automatic Battery Back-up Switch	2.5V to 15V	5µA	38mA	50mV (Note 2)	-25°C to 85°C
ICL7673C						0°C to 70°C
ICL8211M	Programmable Voltage Detectors	1.8V to 30V	350µA	3mA	1.15 + 3.5% 1.15 - 6.0%	-55°C to 125°C
ICL8211C						0°C to 70°C
ICL8212M				9mA	1.15 + 3.5% 1.15 - 13%	-55°C to 125°C
ICL8212C						0°C to 70°C

NOTES:

1. Reference Voltages - Output Voltage Limited by External Device
2. Primary to Back-up Source Voltage Differential

PROTECTION CIRCUITS

PART NUMBER	DESCRIPTION	SUPPLY VOLTAGE RANGE	OVER-VOLTAGE TURN-ON THRESHOLD	TEMPERATURE RANGE	PACKAGE
SP710	Protected Power Switch	4V to 16V	16V to 18.5V	-40°C to 125°C	3 Lead TO-220
SP720	Protection Array IEC 1000-4-2	2V to 30V	+V_{BE} Above V_{CC} or -V_{BE} Below GND	-40°C to 105°C	16 Lead PDIP and SOIC
SP720MD-8	Ceramic Packaged Harris Class B "Equivalent" SP720 Parts with Back-End Conformance to MIL-STD-883	0V to 30V	+V_{BE} Above V_{CC} or -V_{BE} Below GND	-55°C to 125°C	16 Lead SBDIP
SP720MM-8		0V to 30V			20 Pad CLCC

PROTECTION CIRCUITS (Continued)

PART NUMBER	DESCRIPTION	SUPPLY VOLTAGE RANGE	OVER-VOLTAGE TURN-ON THRESHOLD	TEMPERATURE RANGE	PACKAGE
SP720MD	High Reliability Ceramic Packaged SP720 Parts	0V to 30V	$+V_{BE}$ Above V_{CC} or $-V_{BE}$ Below GND	-55°C to 125°C	16 Lead SBDIP
SP720MM		0V to 30V			20 Pad CLCC
SP721	Protection Array IEC 1000-4-2	0V to 30V	$+V_{BE}$ Above V_{CC} or $-V_{BE}$ Below GND	-40°C to 105°C	8 Lead PDIP and SOIC
SP723	Protection Array IEC 1000-4-2	2V to 30V	$+V_{BE}$ Above V_{CC} or $-V_{BE}$ Below GND	-40°C to 105°C	8 Lead PDIP and SOIC

MULTIPLEX COMMUNICATION CIRCUITS

PART NUMBER	DESCRIPTION	APPLICATIONS	SUPPLY VOLTAGE	TEMPERATURE RANGE	PACKAGE
CDP68HC68S1	SPI Serial Bus Interface with Collision Detection and Arbitration	CCD 8/16-Bit Serial Bus	4-7V	-40°C to 105°C	14 Lead PDIP and 20 Lead SOIC
HIP7010	J1850 Byte Level Interface Circuit	J1850 Class B Variable Pulse Width (VPW)	3V to 6V	-40°C to 125°C	14 Lead PDIP and SOIC
HIP7020	J1850 Bus Transceiver I/O for Multiplex Wiring	J1850 Class B Variable Pulse Width (VPW)	6V to 24V	-40°C to 125°C	8 Lead PDIP and 8 Lead SOIC
HIP7030A0	J1850 8-Bit 68HC05 Microcontroller Emulator Version	J1850 Class B Variable Pulse Width (VPW)	3V to 6V	-40°C to 125°C	68 Lead PLCC
HIP7030A2	J1850 8-Bit 68HC05 Microcontroller	J1850 Class B Variable Pulse Width (VPW)	3V to 6V	-40°C to 125°C	28 Lead PDIP and 28 Lead SOIC

SPECIAL FUNCTION IC

PART NUMBER	DESCRIPTION	MAX SUPPLY VOLTAGE	MAX SUPPLY CURRENT	SENSOR/INPUT RANGE	I_{OUT} MAX	V_{OUT} MAX
CA3165E	Electronic Switching Circuits for Ignition and Proximity Sensing in General Purpose Control Circuits Using Q-Loaded Inductive Sensor (Multiple Outputs).	24V	18.4mA	Q-Loaded Self-Osc. Coil Pickup (~100µH)	120mA (Sink)	24V
CA3274	Power Switch with Current Limiting Feedback Control and Current Limiter Sense Flag. Used for Ignition and Current Controlled Switching Applications.	16V	25mA	0.4V to 2V Input Switching Thresholds (w/hysteresis)	200mA (Sink/ Source)	16V
HIP9010AB	Analog Signal Processing IC Suitable for Engine "Knock" Detection. Extensive Signal Processing is Achieved in the Frequency and Time Domain within the IC Via Microprocessor Control Through a "SPI" Interface Bus.	Intended to Operate From Same Power Supply as a Microcontroller with a Maximum V_{DD} of 7V and has a Maximum Supply Current of 12mA at 5V.		5mV to 8 V_{RMS} Input (from Piezoelectric Type Sensors). In the Application, the Useful Dynamic Signal Range is Usually less than 64dB	Output Signal, Pin 4 INOUT, is an Analog Voltage That Ranges From Approximately V_{DD} to 0.5V.	
HIP9020A, HIP9020AB	Vehicle Speed Sensor (VSS) Buffer ICs with Pre and Post Scaler Dividers for Processing Sinusoidal Waveforms from Magnetic Pickup Sensors with divide by 1, 6-11 Prescaling and 1, 2 Post Scaling Options (Multiple Outputs).	Shunt Regulator ~5.7V with Series Forward Diode/Resistor to Power Supply (V_{BATT}); or Use Ext. 5 ±0.3V Power Supply (Max I_{CC} = 12mA)		±(0.25 to 100)V with 40kΩ Ext. Series Current Limiting Resistor to Input	15mA (Sink)	24V
CA3020, CA3020A	Multipurpose Differential Power Amplifier and Switch Control Circuit.	3V to 9V 3V to 12V	20mA	±100mV	300mA	18V/ 25V
CA3094, CA3094A, CA3094B	Multipurpose Differential Programmable Power Switch and Power Amplifier with 30MHz Unity Gain-BW.	To 44V	300mA	±100mV, (100dB Gain, Adj. with Operational Transconductance Amplifier Input)	To 300mA	To 44V

CONSUMER PRODUCTS

HORIZONTAL SYNC PROCESSORS
CA1391, CA1394, CA3154

- Horizontal Oscillator/Drivers
- Sync and AGC Processor
- PAL and NTSC Compatible

CHROMA/LUMA PROCESSORS AND DEMODULATORS
CA3070, CA3128E, CA3126

- VCO with Phase Control and Shunt Regulator
- 3.58MHz Demodulator and Carrier Regenerator
- NTSC Chroma Processor

MISCELLANEOUS RADIO/TV FUNCTIONS
CA3224, CA3088

- Automatic CRT Bias Circuit
- AM Receiver and Audio Amp
- General Purpose Amp Array

SECURITY AND SURVEILLANCE
CA3254

- RS-170 Sync Generator for Camera Application
- NTSC Version
- Crystal Control Mode
- PLL to Power Line Zero Crossing

VHF/UHF PRESCALER
CA3179

- DC to 1.25GHz
- High Sensitivity
- Divide by 64 and or 256
- Complementary ECL Outputs

IF AMPLIFIER AND DETECTOR
CA2111A, CA3012, CA3014, CA3089, CA3189

- FM IF Amplifiers with Limiters and Detectors
- Wide Band Amplifiers
- Wide Band Discriminator/Amplifiers
- Electronic Attenuators
- Quadrature Detect, AGC, and Log Output Devices
- FM IFs with Channel Detection

HORIZONTAL/VERTICAL COUNTDOWN AND SYNC PROCESSORS

CA1391, CA1394
TV HORIZONTAL PROCESSORS

- CA1391E - Positive Horizontal Sawtooth Input
- CA1394E - Negative Horizontal Sawtooth Input
- Internal Shunt Regulator
- Linear Balanced Phase Detector
- Preset Hold Control Capability
- Pull-In (Typ) . . . . . ±300Hz
- Low Thermal Frequency Drift
- Small Static Phase Error
- Variable Output Duty Cycle
- Adjustable DC Loop Gain

CA3154
TV SYNC/AGC/HORIZONTAL SIGNAL PROCESSOR

- Horizontal Oscillator With AFC
- Sync Separator With Noise Immunity
- Strobed AGC System
- If AGC Output
- Delayed Outputs For Forward Or Reverse AGC Tuners
- Internal Noise Threshold
- High Impedance Video Input
- Choice Of Dual External Time Constants For Sync Separator Noise Immunity
- RF AGC Delay Externally Controlled
- Output Short-Circuit Protection

MISCELLANEOUS RADIO/TV FUNCTIONS

CA3088
AM RECEIVER SUBSYSTEM AND GENERAL PURPOSE AMPLIFIER ARRAY

- Excellent Overload Characteristics
- AGC for IF Amplifier
- Buffered Output Signal for Tuning Meter
- Internal Zener Diode Provides Voltage Regulation
- Applications
  - AM Broadcast and Communications Receivers
  - AM Converter
  - IF Amplifiers
  - Detector
  - Audio Preamplifier

CA3224
AUTOMATIC PICTURE TUBE BIAS CIRCUIT

- Automatic Picture Tube Bias Cutoff Control
- Automatic Background Color Balance
- Eliminates Grey Scale Adjustments
- Compensates For Cathode-to-Heater Leakage

PRESCALERS/BAND SWITCHES

CA3179
1.25GHz PRESCALER

- Broadband Operation
  - DC to 1.25GHz
- High Sensitivity
- Standard T^2L or ECL Power Supply
- Dual Mode Operation
  - VHF/UHF. . . . . ÷64/÷256
- Complementary ECL Outputs

IF AMPLIFIERS AND DETECTORS

CA2111A
FM IF AMPLIFIER-LIMITER AND QUADRATURE DETECTOR

- Direct Replacement for ULN2111A and MC1357
- Good Sensitivity:
  - Input Limiting Voltage (Knee) 400mV
  - Typ 10.7MHz; 250mV
  - Typ . . . . . .4.5MHz and 5.5MHz
- Excellent AM Rejection
  - 45dB (Typ) 10.7MHz
- Provision for Output From 3-Stage IF Amplifier Section
- Applications
  - FM IF and TV Sound IF Applications

CA3012
WIDEBAND AMPLIFIERS

- Exceptionally High Amplifier Gain
  - Power Gain (Typ) . . . . . 4.5MHz - 75dB
- Excellent Limiting Characteristics
  - Input Limiting Voltage (Knee) 600µV
  - Typ 10.7MHz
- Wide Frequency Capability
  - 100kHz to >20MHz

IF AMPLIFIERS AND DETECTORS (Continued)

CA3014
WIDEBAND AMPLIFIER DISCRIMINATORS

- Exceptionally High Gain
  - Power Gain (Typ) . . . . . 4.5MHz - 75dB
- Excellent Limiting Characteristics
  - Input Limiting Voltage (Knee) 300mV
    Typ 4.5MHz
- Excellent AM Rejection
  - >50dB 4.5MHz
- High Audio-Voltage Recovery
  - 220mV (Typ) . . . . . 4.5MHz, 25kHz Deviation

CA3089
FM IF SYSTEM
CA3189
FM IF SYSTEM WITH ON CHANNEL DETECTOR

- Exceptional Limiting Sensitivity
  - 12mV (Typ) . . . . . -3dB Point
- Low Distortion
  - 0.1% (Typ) (with Double Tuned Coil)
- Single Coil Tuning Capability
- Improved S + N/N Ratio
- Externally Programmable Recovered Audio Level
- Provides Specific Signal for Control of Interchannel Muting (Squelch)
- Provides Specific Signal for Direct Drive of a Tuning Meter
- On Channel Step for Search Control
- Provides Programmable AGC Voltage for RF Amplifier
- Provides a Specific Circuit for Flexible Audio Output
- Internal Supply Voltage Regulators
- Applications
  - FM IF Amplifier Applications In High-Fidelity
  - Automotive
  - Communications Receivers
  - IF Amplifier
  - Quadrature Detector
  - AF Preamplifier,
  - Specific Circuits for AGC
  - AFC, Muting (Squelch)
  - Tuning Meter

POWER TOOLS

HIP9021
PORTABLE BATTERY DRIVE/TORQUE CONTROLLER FOR N-CHANNEL MOSFETs IN MOTOR CONTROL SYSTEMS

- MOSFET Driver and DC Motor Controller
- Torque Control and Overload Protection
- Battery Power Supply . . . . . +5V to 15V
- BiMOS IC with Low Operating Current
  - Maximum Supply Current 1.5mA
  - Maximum Input Leakage Currents 1.5µA
- Typical Oscillator Frequency 5kHz
- Power-On-Reset Control
- 10mA Drive Capability for Gate Output
- Operating TemperatureRange . . . . . -40°C to 85°C

CHROMA/LUMA SYSTEMS

CA3070
TELEVISION CHROMA SYSTEM

- Voltage Controlled Oscillator
- Keyed APC and ACC Detectors
- DC Hue Control
- Shunt Regulator

CA3128E
TV CHROMA PROCESSOR FOR PAL SYSTEMS

- Phase-Locked Subcarrier Regeneration Utilizes Sample-and-hold Techniques in the Automatic Frequency Phase Control (AFPC) Servo Loop
- Automatic Chrominance Control (ACC)/Killer Detector Employes Sample-and-Hold Techniques
- Supplementary ACC with an Overload Detector to Prevent Oversaturation of the Picture Tube
- Sinusoidal Subcarrier Output

CA3126
TV CHROMA PROCESSOR AND CARRIER REGENERATOR

- Phase-Locked Subcarrier Regeneration Utilizes Sample-and-Hold Techniques
- Automatic Chrominance Control (ACC)/Killer Detector Employes Sample-and-Hold Techniques
- Supplementary ACC with An Overload Detector to Prevent Oversaturation of the Picture Tube
- Sinusoidal Subcarrier Output
- Keyed Chroma Output
- Emitter-Follower Buffered Outputs For Low Output Impedance
- Linear DC Saturation Control

SECURITY AND SURVEILLANCE

CA3254
RS-170 SYNC GENERATOR

- Single LSI IC with Multiple Genlock Capability
- EIA RS-170 Sync with 2:1 Interlace
- PLL for Lock to Power Line Zero Crossing
- Genlocks to RS-170, RS-330 or Random Interlace
- Crystal Control Mode Sync Option
- Four Modes of Genlock Control
- I^2L Injection Configured to Work in Series with the Camera Tube Filament
- Applications
  - All RS-170 Sync Systems
  - Security Cameras
  - CCTV Systems
  - Cable Systems
  - Text Encoder Sync
  - Computer Display Systems
  - Graphics Systems

AUTOMOTIVE SPECIAL FUNCTION

CA3165
ELECTRONIC SWITCHING CIRCUIT

- Switching Initiated by Damping of Internal Oscillator
- Proximity Sensing of Rotational Motion
- Repeatable Timing of Switching States
- Five Outputs - Two Complementary Pairs and One Non-Inverting Output (CA3165E1)
- Two Outputs - One Complementary Pair (CA3165E)

CA3282
CMOS OCTAL SERIAL SOLENOID DRIVER

AnswerFAX Document # 2767

- Output Current Drive Capability
  - All Outputs ON, Equal . . . . . 0.625A Each
  - Per Output Individually . . . . . 1A Each
  - Maximum Total of Outputs ON 5A
- High Voltage Power BiMOS Outputs
  - 8 Open Drain NDMOS Drivers
  - Individual Output Latch
  - Over-Current Limit Protection 1.05A
  - Over-Voltage Clamp Protection 30V

Intelligent Power Package Selection Guide

Using the Selection Guide:

The first character of each entry indicates the package type, while the number preceding the decimal point details the package lead count. Except for Can packages, the decimal point and succeeding numbers specify the package width in inches (e.g. __.15 = 150 mil width)

PART NUMBER	PDIP	SOIC/ SSOP	SBDIP	PLCC	PSOP	CERDIP	FLAT-PACK	CLCC	SIP	CAN	DOCUMENT NUMBER
CA723E, CE	E14.3										788
CA723T, CT										T10.C	788
CA1524E	E16.3										1239
CA1524F						F16.3					1239
CA2524E	E16.3										1239
CA2524F						F16.3					1239
CA3020, A										T12.B	339
CA3059	E14.3										490
CA3079	E14.3										490
CA3085, A, B										T8.C	491
CA3085E, AE, BE										E8.3	491
CA3094T										T8.C	598
CA3094E	E8.3										598
CA3094M		M8.15									598
CA3165E	E8.3										1278
CA3242E	E16.3										1561
CA3252E	E16.3										1542
CA3252M		M20.3									1542
CA3262E, AE	E16.3										1836
CA3262AM		M24.3									1836
CA3262AQ				N28.45							1836
CA3272AQ				N28.45							2223
CA3272AM		M28.3									2223
CA3273									Z3.1A		2113
CA3274E	E8.3										2222
CA3275E	E14.3										2159
CA3277E	E16.3										2792
CA3282AS1									Z15.05A		2767
CA3282AS2									Z15.05B		2767
CA3292AQ				N28.45							2223
CA3292AM		M28.3									2223
CA3524E	E16.3										1239
CA3524F						F16.3					1239
CDP68HC68S1E	E14.3										1918
CDP68HC68S1M		M20.3									1918

Package information is available in Section 16.

Intelligent Power Package Selection Guide

PART NUMBER	PDIP	SOIC/ SSOP	SBDIP	PLCC	PSOP	CERDIP	FLAT-PACK	CLCC	SIP	CAN	DOCUMENT NUMBER
HIP0045AB					M20.433						4047
HIP0050IP	E20.3										4034
HIP0050IB		M24.3									4034
HIP0051IB		M20.3									4155
HIP0060AB		M24.3									4045
HIP0080AM				N28.45							3018
HIP0081AS1									Z15.05A		3018
HIP0081AS2									Z15.05B		3018
HIP0082AB					M20.3A						3643
HIP0082AS1									Z15.05A		3643
HIP0082AS2									Z15.05B		3643
HIP1030AS									Z5.067		2788
HIP1031AS									Z5.067		3596
HIP1090AS									Z3.1B		3398
HIP2030IM				N28.45							3691
HIP2100IB		M8.15									4022
HIP2500IP	E14.3										2801
HIP2500IPI	E16.3										2801
HIP2500IB		M16.3									2801
HIP4020IB		M20.3									3976
HIP4080IP, AIP	E20.3										3178
HIP4080IB, AIB, AIBT (Tape and Reel)		M20.3									3178
HIP4081IP, AIP	E20.3										3556
HIP4081IB, AIB, AIB (Tape and Reel)		M20.3									3556
HIP4082IP	E16.3										3676
HIP4082IB		M16.15									3676
HIP4083AP		M16.15									4223
HIP4083AB	E16.3										4223
HIP4086AP		M24.3									4220
HIP4086AB	E24.6										4220
HIP5010IB		M16.3									4029
HIP5010IS									Z7.05B		4029
HIP5010IS1									Z7.05C		4029
HIP5011IB		M16.3									4029
HIP5011IS									Z7.05B		4029
HIP5011IS1									Z7.05C		4029
HIP5015IS									Z7.05B		4142
HIP5015IS1									Z7.05C		4142

Package information is available in Section 16.

Intelligent Power Package Selection Guide

PART NUMBER	PDIP	SOIC/ SSOP	SBDIP	PLCC	PSOP	CERDIP	FLAT-PACK	CLCC	SIP	CAN	DOCUMENT NUMBER
HIP5016IS									Z7.05B		4142
HIP5016IS1									Z7.05C		4142
HIP5020DB									M28.3		4243
HIP5061DS									Z7.05A		3390
HIP5500IP	E20.3										3210
HIP5500IB		M20.3									3210
HIP5600IS									Z3.1B		3270
HIP5600IS2									Z3.1D		3270
HIP6002CB		M20.3									4270
HIP6003CB		M16.15									4274
HIP6004CB		M20.3									4275
HIP6005CB		M20.3									4276
HIP6006CB		M14.15									4306
HIP6007CB		M14.15									4307
HIP6008		M16.15									4281
HIP60011		M14.15									4409
HIP60012		M14.15									4324
HIP60013		M14.15									4325
HIP60014		M20.3									4420
HIP60015		M20.3									4421
HIP7010AP	E14.3										3644
HIP7010AB		M14.15									3644
HIP7020AP	E8.3										3642
HIP7020AB		M8.15									3642
HIP7030A0AM				N68.95							3645
HIP7030A2AP	E28.6										3646
HIP7030A2AM		M28.3									3646
HIP7038A8IF							K28.E				3647
HIP9010AB		M20.3									3601
HIP9020AP	E14.3										2790
HIP9020AB		M20.3									2790
HV3-2405E-5, -9	E8.3										2487
HV400IB		M8.15									2850
HV400IP	E8.3										2850
HV400MJ/883			D8.3								3584
ICL7660ACPA, AIPA	E8.3										3072
ICL7660ACBA, AIBA		M18.5									3072
ICL7660CTV, MTV										T8.C	3072
ICL7660CBA		M8.15									3072

Package information is available in Section 16.

PART NUMBER	PDIP	SOIC/ SSOP	SBDIP	PLCC	PSOP	CERDIP	FLAT-PACK	CLCC	SIP	CAN	DOCUMENT NUMBER
ICL7660CPA	E8.3										3072
ICL7660SCBA, SIBA		M8.15									3179
ICL7660SCPA, SIPA	E8.3										3179
ICL7660SCTV, SITV, SMTV										T8.C	3179
ICL7662CTV, MTV, ITV										T8.C	3181
ICL7662CPA, IPA	E8.3										3181
ICL7662CBD, CBD-O, IBD		M14.15									3181
ICL7663SCBA, SIBA, ACBA, AIBA		M8.15									3180
ICL7663SCPA, SIPA	E8.3										3180
ICL7663SACPA, AIPA	E8.3										3180
ICL7665SCBA, SIBA, SACBA, SAIBA		M8.15									3182
ICL7665SCPA, SIPA, SACPA, SAIPA	E8.3										3182
ICL7667CBA		M8.15									2853
ICL7667CPA	E8.3										2853
ICL7667CJA, MJA						F8.3A					2853
ICL7667CTV, MTV										T8.C	2853
ICL7673CPA	E8.3										3183
ICL7673CBA		M8.15									3183
ICL7673ITV										T8.C	3183
ICL8211CPA	E8.3										3184
ICL8211CBA		M8.15									3184
ICL8211CTY, MTY										T8.C	3184
ICL8212CPA	E8.3										3184
ICL8212CBA		M8.15									3184
ICL8212CTY, MTY										T8.C	3184
SP600	E22.4										2428
SP601	E22.4										2429
SP710AS									Z3.1B		2789
SP720AP	E16.3										2791
SP720AB		M16.15									2791
SP720MD			D16.3								3683
SP720MM								J20.A			3683
SP721AP	E8.3										3590
SP721AB		M8.15									3590
SP723AP	E8.3										4145

Package information is available in Section 16.

Check our world wide web site for the most current documentation.

POWER TRANSISTORS 8

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MOSFETs

ADVANCED POWER MOS

Features

- Current Limiting, Voltage Limiting and Current Sensing
- ESD Protection
- Logic Level
- Ultra High Speed (t < 5ns) Buffered FET

Applications

- Fault Tolerant Motor Drives
- Stall Protection
- Current Inrush Limiting
- Automotive Headlamp Drivers
- Diagnostic Motor Controls

JEDEC MOSFETs

Features

- JEDEC Registered MOSFETs for Military and Space Applications
- BV_{DSS} 60V to 500V
- N and P-Channel Devices
- Hermetic Packages

Applications

- Military
- High Reliability
- Space

LOGIC LEVEL MOSFETs

Features

- Full Drain Current Rating with 5V Gate Drive
- Microprocessor and Logic Compatible
- Electrostatic Discharge Protected Gates Available
- Avalanche Energy Capability
- Both N and P-Channel Devices
- BV_{DSS} Ratings of 12V to 200V
- Surface Mount Packages to TO-218/TO-247 Packages

Applications

- Direct Logic Control of 50A Loads
- Minimal Static Drive Current Required on the Gate
- Solid State DC Relays
- Lamp Drivers
- Stepper Motor Drives
- Small Motor Controls
- High Side Drivers
- SMPS MOSFET Predrivers

STANDARD RFx, IRFx AND MegaFET MOSFETs N AND P-CHANNEL

Features

- Size 1 Through 6 Die Sizes
- All IRF Types Avalanche Capable
- BV_{DSS} up to 1000V

Applications

- Offline and DC/DC Converters
- Power Supplies
- Pulse Generators
- Super Efficient DC/DC Converters
- Solid State DC Relays
- Low Loss DC Switches
- Lamp Drivers
- Operational Amplifier Buffer Stage
- Stepper Motor Drives
- Small Motor Controls
- Laser Diode Pulse Generators
- SMPS Drivers

Advanced Power MOS Products

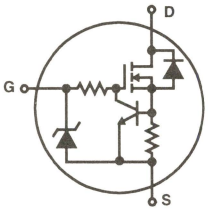
CURRENT LIMITING MOSFETs

Features

- Current Limits to a Pre-Set Level in a Shorted Load Condition
- "Logic-Level" Gate Input Allows Fully on Condition at 5V
- Monolithic Device Incorporates a Bipolar Transistor, 2 Resistors, a Zener Diode and a Power MOSFET
- ESD Protected to 2kV

MAXIMUM RATINGS				PACKAGE
BV_{DSS} (V)	$I_{DS(LIM)}$ (A)	$r_{DS\ (ON)}$ (Ω)	ESD (kV)	TO-220AB
80	1	0.75	2	RLP1N08LE
80	5.5	0.12	2	RLP5N08LE

TERMINAL DIAGRAM



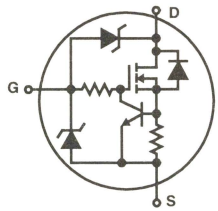
VOLTAGE CLAMPING, CURRENT LIMITING MOSFETs

Features

- Excessive Drain-Source Voltage Clamped by Active Region Turn-On, Clamp Voltage Level: 60V - 85V
- Current Limits to a Pre-Set Level in a Shorted Load Condition
- Monolithic Device Incorporates a Bipolar Transistor, 2 Resistors, 2 Zener Diodes and a Power MOSFET

MAXIMUM RATINGS				PACKAGE	
BV_{DSS} (V)	$I_{DS(LIM)}$ (A)	$r_{DS\ (ON)}$ (Ω)	ESD (kV)	TO-220AB	TO-251AA
55	1	0.75	2	RLP1N06CLE	
55	0.3	5	2	RLP03N06CLE	RLD03N06CLE

TERMINAL DIAGRAM



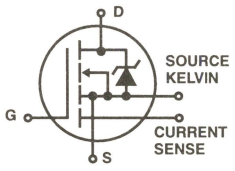
CURRENT SENSING MOSFETs

Features

- Built-In Current Sensing Function to be Used as a Feed-Back Signal for Control and/or Protection
- Low $r_{DS(ON)}$ = 0.1Ω max
- Current Sensing Ratio = 1500 ±10%
- Avalanche Energy Rated for Ruggedness

MAXIMUM RATINGS			PACKAGE
BV_{DSS} (V)	I_{DS} (A)	$r_{DS\ (ON)}$ (Ω)	TS-001AA
100	18	0.10	RFB18N10CS

TERMINAL DIAGRAM



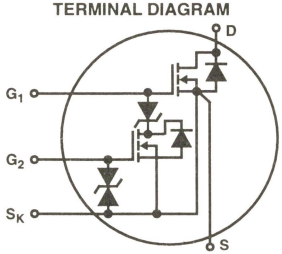
BUFFERED FET

Features

- Fall Time t_f = 5ns (Typical)
- Similar Electrical Performance of an IRF450
- $r_{DS(ON)}$ 0.48Ω max
- Avalanche Rated to I_{DM} at 25°C and 150°C
- ESD Protected Gates 2KV

MAXIMUM RATINGS				PACKAGE
BV_{DSS} (V)	I_{DS} (A)	$r_{DS\ (ON)}$ (Ω)	t_F (ns)	TO-247
500	10	0.48	5	RFV10N50BE

TERMINAL DIAGRAM



N-Channel Power MOSFET

RUGGED IRF SERIES

Features

- Single Pulse Avalanche Energy Rated
- SOA is Power Dissipation Limited
- Nanosecond Switching Speeds
- Linear Transfer Characteristics
- High Input Impedance
- Allows Reduced Protection Circuitry
- Reduced Drive Requirements
- Increased System Reliability

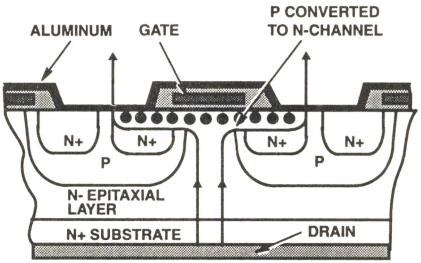
Description

The Rugged Series of Power MOSFETs are designed, tested, and guaranteed to withstand a specified level of circuit induced electrical stress in the breakdown avalanche mode of operation. These are n-channel enhancement mode polysilicon gate power field effect transistors designed for applications such as switching regulators, switching converters, motor and relay drivers, and drivers for high power bipolar switching transistors requiring high speed and low gate drive power.

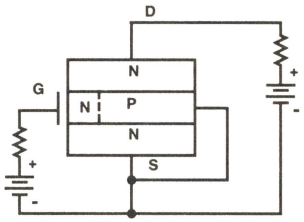
Using state-of-the-art integrated circuit processing techniques, these Rugged MOSFETs provide superior performance in inductive switching applications. The design is optimized to suppress the parasitic bipolar transistor and improve system reliability. These types can be driven directly from integrated circuits.

Rugged Series devices are identified by the suffix letter R following the type number or by the inclusion of a UIS SOA rating chart on the data sheet. This chart provides the user with a broad range of application usages for this capability. Application notes AN9321 and AN9322 detail this rating system.

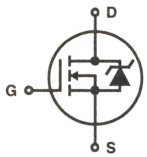
Cross Section of Chip Structure



Junction Diagram Showing Biasing Arrangements



Schematic Symbol



MOSFET Ordering Nomenclature

HP TYPES

H P B 60N06 S T

PREFIX
H: Harris

FAMILY
P: Power

PACKAGE DESIGNATOR
B: TO-263 (3 Lead)
D or U: TO-251
P: TO-220
P0 or W: TO-247
R: TO-252
T: SOT-223
K: BUK Series

PART NUMBER

SURFACE MOUNT DESIGNATOR
DY: SO-8
L: TO-262
S: TO-263 or TO-252

TAPE AND REEL DESIGNATOR

HUF TYPES

H UF 72453 D3 S T

PREFIX
H: Harris

FAMILY
UltraFET™ Series

5 DIGIT PART NUMBER

PACKAGE DESIGNATOR
P3: TO-220
P5: TO-220, TS-001 (5 Lead TO-220)
G3: TO-247
G5: TO-247 (5 Lead)
S3: TO-262/263, TO-262AA/263AA (D^2-PAK)
S5: TO-262/263, TO-262AA/263AA (5 Lead)
D3: TO-251/252, TO-251AA/252AA (D-PAK
T3: SOT-223
R3: SOT-23
DK8: Dual Die, MS-012AA (SO-8)
SK8: Single Die, MS-012AA (SO-8)
CK8: Complementary (N and P) Die, MS-012AA (SO-8)

SURFACE MOUNT DESIGNATOR
TO-263, TO-252 and SOT-223

TAPE AND REEL DESIGNATOR
TO-263, TO-252, SO-8 and SOT-223

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IRF TYPES

IR XX XXX

EQUIVALENT IR PART

PACKAGE DESIGNATION:
C: 5 Lead TO-220, Current Sensing
FA: TO-204AA (TO-3)
FD: 4 Lead DIP
FF: TO-205AF (TO-39)
FP: TO-247
FR: TO-252 (D-PAK)
FU: TO-251 (D-PAK)
F1-F4: TO-204AA (TO-3)
F5-F8: TO-220

DIE DESIGNATION
All Numeric Characters
N-Channel (Three Digits) - XXX
P-Channel (Four Digits) - 9XXX

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RF, RL TYPES

RX X XX X XX XXX

DEVICE TYPE
RF: Standard MOSFET
RL: Current Limited MOSFET

PACKAGE DESIGNATOR
A: MO-093AA
B: TS-001
D: TO-251AA, TO-252AA (D-PAK)
G: TO-247
H: TO-218AC
K: TO-204AE
L: TO-205AF
M: TO-204AA
P: TO-220AB
V: 5 Lead TO-247
1K: MS-012AA
1S: TO-262, TO-263 (D^2-PAK)

SUFFIX
L: Logic Level 5V Gate
SM: Surface Mount Leadform (TO-252, TO-263)
E: ESD Protected Device
CS: Current Sensing
C: Voltage Clamping
B: Integral Turn-Off Driver
9A: Tape and Reel (TO-252AA, TO-263AB)
96: Tape and Reel (MS-012AA (SO-8))

VOLTAGE RATING/10 (Note)
i.e., 05 = 50V, 10 = 100V, 20 = 200V, etc.

POLARITY (Note)
N: N-Channel
P: P-Channel

CURRENT RATING (Note)
1 = 1A, 10 = 10A, 25 = 25A, etc.

EXAMPLE:

RLP1N08LE ESD Protected, Current Limited, TO-220, 1A, N-Channel, 80V Logic Level MOSFET
RFD15N05SM D-PAK,15A, N-Channel, 50V, Surface Mount Leadform MOSFET
RFP12N06RLE TO-220, 12A N-Channel, 60V, Rugged, Logic Level, ESD Protected MOSFET

NOTE: For RF1KXXXXX Series 5 digit part number and no rating information.

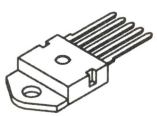
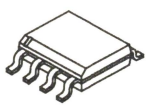
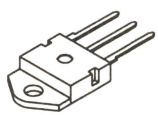
RF1S TYPES (TO-262, TO-263 IRF TYPES)

RF1S XXX XX

EQUIVALENT IR PART
TO-262, TO-263 Surface Mount Package (D^2-PAK)

DIE DESIGNATOR
All Numeric Characters
N-Channel (Three Digits) - XXX
P-Channel (Four Digits) - 9XXX

SUFFIX
SM: Surface Mount (TO-263)
SM96: Tape and Reel

4-LEAD DIP	MO-093AA	MS-012AA	TO-218AC
			
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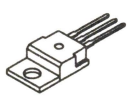
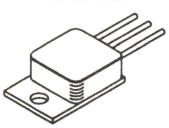
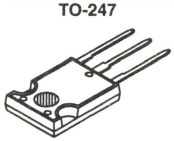
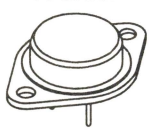
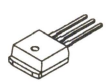
			
TO-254AA	**TO-247**	**TO-204AA**	**TO-262AA**
			
TO-263AB	**TS-001AA**	**SOT-223**	**SOT-23**
		PROPORTIONALLY CORRECT ENLARGED FOR VIEWING	PROPORTIONALLY CORRECT ENLARGED FOR VIEWING

MOSFET Product Selection Trees

N-CHANNEL MOSFETs

PLASTIC PACKAGE
N-CHANNEL MOSFETs

BUZ11
BUZ20
BUZ21
BUZ32
BUZ351
BUZ41A
BUZ42
BUZ60
BUZ60B
BUZ71
BUZ71A
BUZ72A
BUZ73A
BUZ76
BUZ76A
IRF510
IRF511
IRF512
IRF513
IRF520
IRF521
IRF522
IRF523
IRF530
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IRF645
IRF646
IRF647
IRF710
IRF711
IRF712
IRF713
IRF720
IRF721
IRF722
IRF723
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IRF731
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IRF733
IRF740
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IRF743
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IRF821
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IRF842
IRF843
IRFBC40
IRFBC42
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IRFD112
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IRFD122
IRFD123
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IRFD1Z1
IRFD1Z2
IRFD1Z3
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IRFD212
IRFD213
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IRFD222
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IRFU410
IRFU420
IRFU421
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RF1K49086
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RF1K49157
RF1K49221
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RF1S45N06SM
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RF1S630SM
RF1S640
RF1S640SM
RF1S70N03
RF1S70N03SM
RF1S70N06
RF1S70N06SM
RFA100N05E
RFD14N05
RFD14N05SM
RFD14N06
RFD14N06SM
RFD16N05
RFD16N05SM
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RFD16N06SM
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RFD3055SM
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RFG45N06
RFG50N05
RFG50N06
RFG70N06
RFG75N05E
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RFH12N35
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RFH25N18
RFH25N20
RFH75N05E
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RFP40N10
RFP45N06
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RFP4N06
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RFP4N35
RFP4N40
RFP50N05
RFP50N06
RFP6N45
RFP6N50
RFP70N03
RFP70N06
RFP7N35
RFP7N40

PLASTIC PACKAGE
N-CHANNEL LOGIC LEVEL DEVICES

RF1K49092	RFD14N05L	RFD7N10LESM	RFP2N10L
RF1K49156	RFD14N05LSM	RFG40N10LE	RFP2N12L
RF1K49211	RFD14N06L	RFG45N06LE	RFP2N15L
RF1S23N06LE	RFD14N06LSM	RFG50N05L	RFP2N18L
RF1S23N06LESM	RFD15N06LE	RFG50N06LE	RFP2N20L
RF1S30N06LE	RFD15N06LESM	RFP10N12L	RFP3055LE
RF1S30N06LESM	RFD16N03L	RFP10N15L	RFP30N06LE
RF1S40N10LE	RFD16N03LSM	RFP12N06RLE	RFP40N10LE
RF1S40N10LESM	RFD16N05L	RFP12N08L	RFP42N03L
RF1S42N03L	RFD16N05LSM	RFP12N10L	RFP45N03L
RF1S42N03LSM	RFD16N06LE	RFP14N05L	RFP45N06LE
RF1S45N03L	RFD16N06LESM	RFP14N06L	RFP4N05L
RF1S45N03LSM	RFD3055LE	RFP15N05L	RFP4N06L
RF1S45N06LE	RFD3055LESM	RFP15N06L	RFP50N05L
RF1S45N06LESM	RFD3N08L	RFP15N08L	RFP50N06LE
RF1S50N06LE	RFD3N08LSM	RFP17N06L	RFP7N10LE
RF1S50N06LESM	RFD4N06L	RFP23N06LE	RFP8N10L
RFD12N06RLE	RFD4N06LSM	RFP25N05L	RFP8N18L
RFD12N06RLESM	RFD7N10LE	RFP25N06L	RFW2N06RLE
		RFP2N08L	

HERMETIC PACKAGE
N-CHANNEL DEVICES

2N6755	2N7225	IRF230	IRF342	IRFF112	IRFF320	RFL2N06
2N6756	2N7227	IRF231	IRF343	IRFF113	IRFF321	RFL4N12
2N6757	2N7228	IRF232	IRF350	IRFF120	IRFF322	RFL4N15
2N6758	BUZ45	IRF233	IRF351	IRFF121	IRFF323	RFM10N12
2N6759	BUZ45A	IRF240	IRF352	IRFF122	IRFF330	RFM10N15
2N6760	BUZ45B	IRF241	IRF353	IRFF123	IRFF331	RFM10N45
2N6761	IRF120	IRF242	IRF420	IRFF130	IRFF332	RFM10N50
2N6762	IRF121	IRF243	IRF421	IRFF131	IRFF333	RFM12N08
2N6765	IRF122	IRF244	IRF422	IRFF132	IRFF420	RFM12N10
2N6766	IRF123	IRF245	IRF423	IRFF133	IRFF421	RFM12N18
2N6767	IRF130	IRF246	IRF430	IRFF210	IRFF422	RFM12N20
2N6768	IRF131	IRF247	IRF431	IRFF211	IRFF423	RFM12N35
2N6769	IRF132	IRF250	IRF432	IRFF212	IRFF430	RFM12N40
2N6770	IRF133	IRF251	IRF433	IRFF213	IRFF431	RFM15N05
2N6782	IRF140	IRF252	IRF440	IRFF220	IRFF432	RFM15N06
2N6784	IRF141	IRF253	IRF441	IRFF221	IRFF433	RFM15N12
2N6786	IRF142	IRF320	IRF442	IRFF222	RFF70N06	RFM15N15
2N6788	IRF143	IRF321	IRF443	IRFF223	RFK25N18	RFM18N08
2N6790	IRF150	IRF322	IRF450	IRFF230	RFK25N20	RFM18N10
2N6792	IRF151	IRF323	IRF451	IRFF231	RFL1N08	RFM3N45
2N6794	IRF152	IRF330	IRF452	IRFF232	RFL1N10	RFM3N50
2N6796	IRF153	IRF331	IRF453	IRFF233	RFL1N12	RFM4N35
2N6798	IRF220	IRF332	IRFAC40	IRFF310	RFL1N15	RFM4N40
2N6800	IRF221	IRF333	IRFAC42	IRFF311	RFL1N18	RFM6N45
2N6802	IRF222	IRF340	IRFF110	IRFF312	RFL1N20	RFM7N35
2N7224	IRF223	IRF341	IRFF111	IRFF313	RFL2N05	RFM7N40

HERMETIC PACKAGE
N-CHANNEL LOGIC LEVEL DEVICES

2N6901	RFL1N10L	RFL2N05L	RFM12N10L
2N6902	RFL1N12L	RFL2N06L	RFM15N05L
2N6903	RFL1N15L	RFM10N12L	RFM15N06L
2N6904	RFL1N18L	RFM10N15L	RFM8N18L
RFL1N08L	RFL1N20L	RFM12N08L	RFM8N20L

P-CHANNEL MOSFETs

PLASTIC PACKAGE P-CHANNEL LOGIC LEVEL DEVICES

RF1K49093
RFD8P06LE
RFD8P06LESM
RFP8P06LE
RFD10P03L
RFD10P03LSM
RFP10P03L

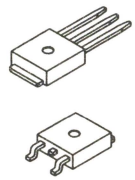
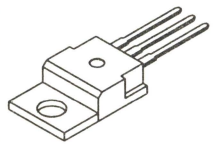
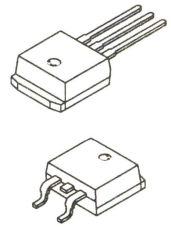
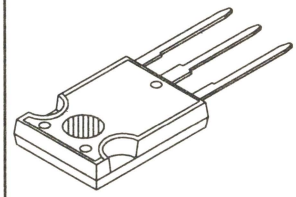
HERMETIC PACKAGE P-CHANNEL DEVICES

2N6804	IRF9232	IRFF9223
2N6849	IRF9233	IRFF9230
2N6851	IRF9240	IRFF9231
2N6895	IRF9241	IRFF9232
2N6896	IRF9242	IRFF9233
2N6898	IRF9243	RFF60P06
IRF9130	IRFF9120	RFK25P08
IRF9131	IRFF9121	RFK25P10
IRF9132	IRFF9122	RFL1P08
IRF9133	IRFF9123	RFL1P10
IRF9140	IRFF9130	RFM10P12
IRF9141	IRFF9131	RFM10P15
IRF9142	IRFF9132	RFM12P08
IRF9143	IRFF9133	RFM12P10
IRF9150	IRFF9220	RFM6P08
IRF9151	IRFF9221	RFM8P08
IRF9230	IRFF9222	RFM8P10
IRF9231		

PLASTIC PACKAGE P-CHANNEL DEVICES

IRF9510	IRF9630	IRFP9151	RF1S9540	RFH25P08
IRF9511	IRF9631	IRFP9240	RF1S9540SM	RFH25P10
IRF9512	IRF9632	IRFP9241	RF1S9630	RFP10P12
IRF9513	IRF9633	IRFP9242	RF1S9630SM	RFP10P15
IRF9520	IRF9640	IRFP9243	RF1S9640	RFP12P08
IRF9521	IRF9641	IRFR9110	RF1S9640SM	RFP12P10
IRF9522	IRF9642	IRFR9120	RFD15P05	RFP15P05
IRF9523	IRF9643	IRFR9220	RFD15P05SM	RFP15P06
IRF9530	IRFD9110	IRFU9110	RFD15P06	RFP2P08
IRF9531	IRFD9113	IRFU9120	RFD15P06SM	RFP2P10
IRF9532	IRFD9120	IRFU9220	RFD8P05	RFP30P05
IRF9533	IRFD9123	RF1S30P05	RFD8P05SM	RFP30P06
IRF9540	IRFD9220	RF1S30P05SM	RFD8P06E	RFP60P03
IRF9541	IRFD9223	RF1S30P06	RFD8P06ESM	RFP6P08
IRF9542	IRFP9140	RF1S30P06SM	RFG30P05	RFP6P10
IRF9543	IRFP9141	RF1S60P03	RFG30P06	RFP8P05
IRF9620	IRFP9142	RF1S60P03SM	RFG60P03	RFP8P06E
IRF9621	IRFP9143	RF1S9530	RFG60P05E	RFP8P08
IRF9622	IRFP9150	RF1S9530SM	RFG60P06E	RFP8P10
IRF9623				

UltraFET™ N-CHANNEL MOSFETs

							
BV_{DSS}	**$r_{DS(ON)}$**	**SO-8**	**SOT-223**	**TO-251AA/252AA**	**TO-220AB**	**TO-262AA/263AB**	**TO-247**
55	0.007				HUF75345P3	HUF75345S3/S3S	HUF75345G3
	0.009				HUF75343P3	HUF75343S3/S3S	HUF75343G3
	0.012				HUF75339P3		HUF75339G3
	0.015				HUF75337P3		HUF75337G3
	0.016				HUF75333P3	HUF75333S3/S3S	HUF75333G3
	0.025			HUF75329D3/D3S	HUF75329P3	HUF75329S3/S3S	HUF75329G3
	0.032			HUF75321D3/D3S	HUF75321P3	HUF75321S3/S3S	
	0.070			HUF75309D3/D3S	HUF75309P3		
	0.090			HUF75307D3/D3S	HUF75307P3		

NOTES:

1. SOT-223 are available only in Tape and Reel packaging format.
2. The TO-252 (D3S) and the TO-263 (S3S) are available in Tape and Reel form. Add the suffix T to the part number.

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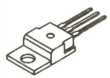
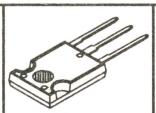
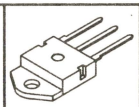
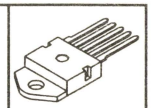
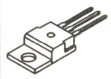
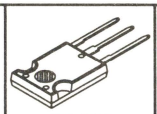
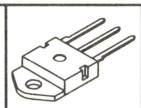
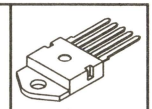
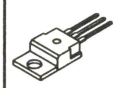
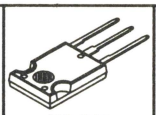
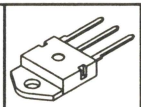
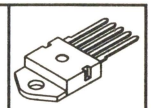
N-CHANNEL MOSFETs

MAXIMUM RATINGS												
												
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-218AC	TO-262AA	TO-263AB	MS-012AA	MO-093
30	3.5	2 x 0.06									RF1K49086	
30	6.3	0.03									RF1K49157	
30	70	0.010			RFP70N03				RF1S70N03	RF1S70N03SM		
50	4.0	0.800			RFP4N05							
50	13	0.120			BUZ71A							
50	14	0.100			BUZ71							
50	14	0.100	RFD14N05	RFD14N05SM	RFP14N05							
50	15	0.140			RFP15N05							
50	16	0.047	RFD16N05	RFD16N05SM								
50	25	0.047			RFP25N05							
50	30	0.040			BUZ11							
50	50	0.022			RFP50N05	RFG50N05						
50	75	0.008				RFG75N05E		RFH75N05E				
50	100	0.008										RFA100N05E
60	0.10	3.200					IRFD1Z3					
60	0.50	2.400					IRFD1Z1					
60	2.0	2 x 0.15									RF1K49154	
60	2.5	2 x 0.13									RF1K49221	
60	4.0	0.800			RFP4N06							
60	12	0.150	RFD3055	RFD3055SM	RFP3055							
60	14	0.100	RFD14N06	RFD14N06SM	RFP14N06							
60	15	0.140			RFP15N06							
60	16	0.047	RFD16N06	RFD16N06SM								
60	25	0.047			RFP25N06				RF1S25N06	RF1S25N06SM		
60	34	0.080				IRFP153						
60	40	0.055				IRFP151						
60	45	0.028			RFP45N06	RFG45N06			RF1S45N06	RF1S45N06SM		
60	50	0.022			RFP50N06	RFG50N06			RF1S50N06	RF1S50N06SM		

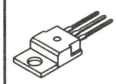
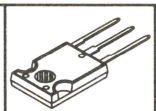
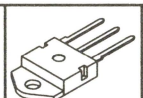
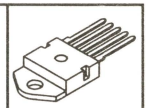
N-CHANNEL MOSFETs (Continued)

MAXIMUM RATINGS												
												
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-218AC	TO-262AA	TO-263AB	MS-012AA	MO-093
60	70	0.014			RFP70N06	RFG70N06			RF1S70N06	RF1S70N06SM		
80	0.80	0.800					IRFD113					
80	1.0	0.600					IRFD111					
80	1.0	0.400					IRFD123					
80	1.3	0.300					IRFD121					
80	2.0	1.050			RFP2N08							
80	4.9	0.740			IRF513							
80	5.6	0.540			IRF511							
80	8.0	0.360			IRF523							
80	8.4	0.270	IRFU121	IRFR121								
80	9.2	0.270			IRF521							
80	12	0.200			RFP12N08							
80	12	0.230			IRF533							
80	14	0.160			IRF531							
80	18	0.100			RFP18N08							
80	25	0.100			IRF543							
80	27	0.099				IRFP143						
80	28	0.077			IRF541							
80	31	0.077				IRFP141						
100	0.40	3.200					IRFD1Z2					
100	0.50	2.400					IRFD1Z0					
100	0.80	0.800					IRFD112					
100	1.0	0.600					IRFD110					
100	1.1	0.400					IRFD122					
100	1.3	0.300					IRFD120					
100	2.0	1.050			RFP2N10							
100	4.7	0.540	IRFU110	IRFR110								
100	4.9	0.740			IRF512							

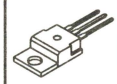
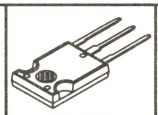
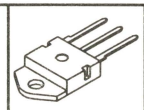
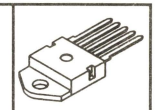
N-CHANNEL MOSFETs (Continued)

MAXIMUM RATINGS												
												
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-218AC	TO-262AA	TO-263AB	MS-012AA	MO-093
100	5.6	0.540			IRF510							
100	8.0	0.360			IRF522							
100	8.4	0.270	IRFU120	IRFR120								
100	9.0	0.250			BUZ72A							
100	9.2	0.270			IRF520							
100	12	0.230			IRF532							
100	12	0.200			RFP12N10							
100	12	0.200			BUZ20							
100	14	0.160			IRF530				RF1S530	RF1S530SM		
100	18	0.100			RFP18N10							
100	19	0.100			BUZ21							
100	22	0.080			RFP22N10							
100	25	0.100			IRF542							
100	27	0.099				IRFP142						
100	28	0.077			IRF540				RF1S540	RF1S540SM		
100	31	0.077				IRFP140						
100	34	0.080				IRFP152						
100	40	0.040			RFP40N10	RFG40N10						
100	40	0.055				IRFP150						
120	2.0	1.750			RFP2N12							
120	10	0.300			RFP10N12							
120	15	0.150			RFP15N12							
150	0.45	2.400					IRFD213					
150	0.60	1.500					IRFD211					
150	0.70	1.200					IRFD223					
150	0.80	0.800					IRFD221					
150	2.0	1.750			RFP2N15							
150	2.6	2.400			IRF613							
150	3.3	1.500			IRF611							

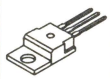
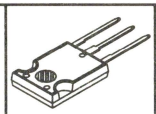
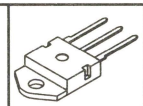
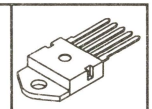
N-CHANNEL MOSFETs (Continued)

MAXIMUM RATINGS												
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-218AC	TO-262AA	TO-263AB	MS-012AA	MO-093
150	4.0	1.200			IRF623							
150	4.6	0.800	IRFU221	IRFR221								
150	5.0	0.800			IRF621							
150	8.0	0.600			IRF633							
150	9.0	0.400			IRF631							
150	10	0.300			RFP10N15							
150	15	0.150			RFP15N15							
150	16	0.220			IRF643							
150	18	0.180			IRF641							
150	18	0.220				IRFP243						
150	20	0.180				IRFP241						
150	27	0.120				IRFP253						
150	33	0.085				IRFP251						
180	3.0	3.500			RFP2N18							
180	12	0.250			RFP12N18							
180	25	0.150						RFH25N18				
200	0.45	2.400					IRFD212					
200	0.60	1.500					IRFD210					
200	0.70	1.200					IRFD222					
200	0.80	0.800					IRFD220					
200	2.0	3.500			RFP2N20							
200	2.6	2.400			IRF612							
200	3.3	1.500			IRF610							
200	3.8	1.200	IRFU222	IRFR222								
200	4.0	1.200			IRF622							
200	4.6	0.800	IRFU220	IRFR220								
200	5.0	0.800			IRF620							
200	5.8	0.600			BUZ73A							

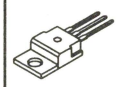
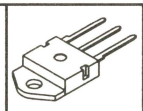
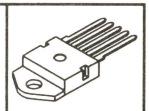
N-CHANNEL MOSFETs (Continued)

MAXIMUM RATINGS												
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-218AC	TO-262AA	TO-263AB	MS-012AA	MO-093
200	8.0	0.600			IRF632							
200	9.0	0.400			IRF630				RF1S630	RF1S630SM		
200	9.5	0.400			BUZ32							
200	12	0.250			RFP12N20							
200	16	0.220			IRF642							
200	18	0.180			IRF640				RF1S640	RF1S640SM		
200	18	0.220				IRFP242						
200	20	0.180				IRFP240						
200	25	0.150						RFH25N20				
200	27	0.120				IRFP252						
200	33	0.085				IRFP250						
250	2.0	2.000			IRF614							
250	2.2	2.000	IRFU214	IRFR214								
250	13	0.340			IRF645							
250	14	0.280			IRF644							
250	14	0.340				IRFP245						
250	15	0.280				IRFP244						
275	13	0.340			IRF647							
275	14	0.340				IRFP247						
275	14	0.280			IRF646							
275	15	0.280				IRFP246						
350	0.30	5.000					IRFD313					
350	0.40	2.500					IRFD323					
350	0.40	3.600					IRFD311					
350	0.50	1.800					IRFD321					
350	1.7	5.000			IRF713							
350	2.0	3.600			IRF711							
350	2.8	2.500			IRF723							

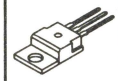
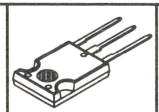
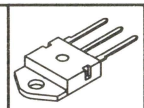
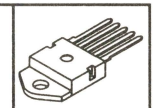
N-CHANNEL MOSFETs (Continued)

MAXIMUM RATINGS												
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	 TO-220AB	 TO-247	4 PIN DIP	 TO-218AC	TO-262AA	TO-263AB	MS-012AA	 MO-093
350	3.1	1.800	IRFU321	IRFR321								
350	3.3	1.800			IRF721							
350	4.0	2.000			RFP4N35							
350	4.5	1.500			IRF733							
350	5.5	1.000			IRF731							
350	7.0	0.750			RFP7N35							
350	8.0	0.800			IRF743							
350	8.7	0.800				IRFP343						
350	10	0.550			IRF741							
350	11	0.550				IRFP341						
350	12	0.380						RFH12N35				
350	14	0.400				IRFP353						
350	16	0.300				IRFP351						
400	0.30	5.000					IRFD312					
400	0.40	2.500					IRFD322					
400	0.40	3.600					IRFD310					
400	0.50	1.800					IRFD320					
400	1.7	5.000			IRF712							
400	2.0	3.600			IRF710							
400	2.6	2.500	IRFU322	IRFR322	BUZ76A							
400	2.8	2.500			IRF722							
400	3.0	1.800			BUZ76							
400	3.1	1.800	IRFU320	IRFR320								
400	3.3	1.800			IRF720							
400	4.0	2.000			RFP4N40							
400	4.5	1.500			IRF732							
400	4.5	1.500			BUZ60B							
400	5.5	1.000			IRF730							

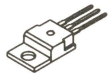
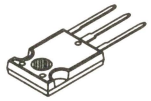
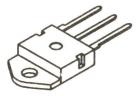
N-CHANNEL MOSFETs (Continued)

MAXIMUM RATINGS												
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-218AC	TO-262AA	TO-263AB	MS-012AA	MO-093
400	5.5	1.000			BUZ60							
400	7.0	0.750			RFP7N40							
400	8.0	0.800			IRF742							
400	8.7	0.800				IRFP342						
400	10	0.550			IRF740							
400	11	0.550				IRFP340						
400	11.5	0.400						BUZ351				
400	12	0.380						RFH12N40				
400	14	0.400				IRFP352						
400	16	0.300				IRFP350						
400	20	0.250				IRFP362						
400	23	0.200				IRFP360						
450	2.0	4.000			IRF823							
450	2.5	3.000	IRFU421	IRFR421	IRF821							
450	3.0	3.000			RFP3N45							
450	4.0	2.000			IRF833							
450	4.5	1.500			IRF831							
450	6.0	1.250			RFP6N45							
450	7.0	1.100			IRF843							
450	7.7	1.100				IRFP443						
450	8.0	0.850			IRF841							
450	8.8	0.850				IRFP441						
450	10	0.600						RFH10N45				
450	12	0.500				IRFP453						
450	14	0.400				IRFP451						
500	1.5	7.000	IRFU410	IRFR410								
500	2.0	4.000			IRF822							
500	2.2	4.000	IRFU422	IRFR422								
500	2.5	3.000	IRFU420	IRFR420	IRF820							

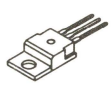
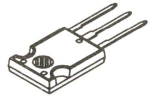
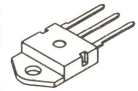
N-CHANNEL MOSFETs (Continued)

MAXIMUM RATINGS												
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-218AC	TO-262AA	TO-263AB	MS-012AA	MO-093
500	3.0	3.000			RFP3N50							
500	4.0	2.000			BUZ42							
500	4.0	2.000			IRF832							
500	4.5	1.500			IRF830							
500	4.5	1.500			BUZ41A							
500	6.0	1.250			RFP6N50							
500	7.0	1.100			IRF842							
500	7.7	1.100				IRFP442						
500	8.0	0.850			IRF840							
500	8.8	0.850				IRFP440						
500	10	0.600						RFH10N50				
500	12	0.500				IRFP452						
500	14	0.400				IRFP450						
500	17	0.350				IRFP462						
500	20	0.270				IRFP460						
600	5.4	1.600			IRFBC42							
600	5.9	1.600				IRFPC42						
600	6.2	1.200			IRFBC40							
600	6.8	1.200				IRFPC40						
1000	3.9	4.200				IRFPG42						
1000	4.3	3.500			RFP4N100	IRFPG40						

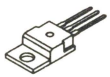
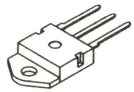
P-CHANNEL MOSFETs

MAXIMUM RATINGS										
										
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-218AC	TO-262AA	TO-263AB
30	60	0.027			RFP60P03	RFG60P03			RF1S60P03	RF1S60P03SM
50	8.0	0.300	RFD8P05	RFD8P05SM	RFP8P05					
50	15	0.150	RFD15P05	RFD15P05SM	RFP15P05					
50	30	0.065			RFP30P05	RFG30P05			RF1S30P05	RF1S30P05SM
50	60	0.030				RFG60P05E				
60	0.60	1.600					IRFD9113			
60	0.80	0.800					IRFD9123			
60	2.5	1.600			IRF9513					
60	3.0	1.200			IRF9511					
60	5.0	0.800			IRF9523					
60	6.0	0.600			IRF9521					
60	8.0	0.300	RFD8P06E	RFD8P06ESM	RFP8P06E					
60	10	0.400			IRF9533					
60	12	0.300			IRF9531					
60	15	0.300			IRF9543					
60	15	0.150	RFD15P06	RFD15P06SM	RFP15P06					
60	16	0.300				IRFP9143				
60	19	0.200			IRF9541	IRFP9141				
60	25	0.150				IRFP9151				
60	30	0.065			RFP30P06	RFG30P06			RF1S30P06	RF1S30P06SM
60	60	0.030				RFG60P06E				
80	2.0	3.500			RFP2P08					

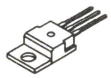
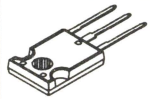
P-CHANNEL MOSFETs (Continued)

MAXIMUM RATINGS										
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-218AC	TO-262AA	TO-263AB
80	6.0	0.600			RFP6P08					
80	8.0	0.400			RFP8P08					
80	12	0.300			RFP12P08					
80	25	0.150						RFH25P08		
100	0.70	1.200					IRFD9110			
100	1.0	0.600					IRFD9120			
100	2.0	3.500			RFP2P10					
100	2.5	1.600			IRF9512					
100	3.0	1.200			IRF9510					
100	3.1	1.200	IRFU9110	IRFR9110						
100	5.0	0.800			IRF9522					
100	5.6	0.600	IRFU9120	IRFR9120						
100	6.0	0.600			RFP6P10					
100	6.0	0.600			IRF9520					
100	8.0	0.400			RFP8P10					
100	10	0.400			IRF9532					
100	12	0.300			IRF9530				RF1S9530	RF1S9530SM
100	12	0.300			RFP12P10					
100	15	0.300			IRF9542					
100	16	0.300				IRFP9142				
100	19	0.200			IRF9540	IRFP9140			RF1S9540	RF1S9540SM
100	25	0.150				IRFP9150		RFH25P10		
120	10	0.500			RFP10P12					

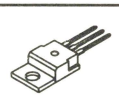
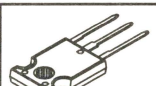
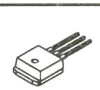
P-CHANNEL MOSFETs (Continued)

MAXIMUM RATINGS										
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	 TO-220AB	TO-247	4 PIN DIP	 TO-218AC	TO-262AA	TO-263AB
150	0.45	2.400					IRFD9223			
150	3.0	2.400			IRF9623					
150	3.5	1.500			IRF9621					
150	5.5	1.200			IRF9633					
150	6.5	0.800			IRF9631					
150	9.0	0.700			IRF9643					
150	10	0.500			RFP10P15					
150	10	0.700				IRFP9243				
150	11	0.500			IRF9641					
150	12	0.500				IRFP9241				
200	0.60	1.500					IRFD9220			
200	3.0	2.400			IRF9622					
200	3.5	1.500			IRF9620					
200	3.6	1.500	IRFU9220	IRFR9220						
200	5.5	1.200			IRF9632					
200	6.5	0.800			IRF9630				RF1S9630	RF1S9630SM
200	9.0	0.700			IRF9642					
200	10	0.700				IRFP9242				
200	11	0.500			IRF9640				RF1S9640	RF1S9640SM
200	12	0.500				IRFP9240				

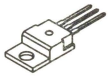
N-CHANNEL LOGIC LEVEL DEVICES

MAXIMUM RATINGS										
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-262AA	TO-263AB	MS-012AA
12	3.5/2.5	0.05/0.13 (COMP N&P)								RF1K49092
12	3.5	2 x 0.05								RF1K49090
12	7	0.020								RF1K49211
30	3.5	2 x 0.06								RF1K49088
30	6.3	0.030								RF1K49156
30	16	0.022	RFD16N03L	RFD16N03LSM						
30	42	0.025			RFP42N03L			RF1S42N03L	RF1S42N03LSM	
30	45	0.022			RFP45N03L			RF1S45N03L	RF1S45N03LSM	
50	4.0	0.800			RFP4N05L					
50	14	0.100	RFD14N05L	RFD14N05LSM	RFP14N05L					
50	15	0.140			RFP15N05L					
50	16	0.047	RFD16N05L	RFD16N05LSM						
50	25	0.047			RFP25N05L					
50	50	0.022			RFP50N05L	RFG50N05L				
60	2.0	0.160					RFW2N06RLE			
60	4.0	0.800	RFD4N06L	RFD4N06LSM	RFP4N06L					
60	12	0.135	RFD12N06RLE	RFD12N06RLESM	RFP12N06RLE					
60	12	0.15	RFD3055LE	RFD3055LESM	RFP3055LE					
60	14	0.100	RFD14N06L	RFD14N06LSM	RFP14N06L					
60	15	0.065	RFD15N06LE	IRFD15N06LESM						
60	2.5	0.130								RF1K49221
60	15	0.140			RFP15N06L					
60	16	0.047	RFD16N06LE	RFD16N06LESM						
60	17	0.100			RFP17N06L					
60	23	0.065			RFP23N06LE			RF1S23N06LE	RF1S23N06LESM	
60	25	0.085			RFP25N06L					
60	30	0.047			RFP30N06LE			RF1S30N06LE	RF1S30N06LESM	
60	45	0.028			RFP45N06LE	RFG45N06LE		RF1S45N06LE	RF1S45N06LESM	

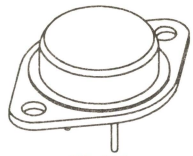
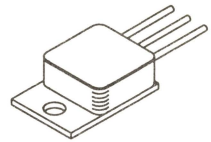
N-CHANNEL LOGIC LEVEL DEVICES (Continued)

MAXIMUM RATINGS										
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	TO-247	4 PIN DIP	TO-262AA	TO-263AB	MS-012AA
60	50	0.022			RFP50N06LE	RFG50N06LE		RF1S50N06LE	RF1S50N06LESM	
80	2.0	1.050			RFP2N08L					
80	3.0	0.800	RFD3N08L	RFD3N08LSM						
80	12	0.200			RFP12N08L					
80	15	0.140			RFP15N08L					
100	2.0	1.050			RFP2N10L					
100	7.0	0.300	RFD7N10LE	RFD7N10LESM	RFP7N10LE					
100	30	0.200			RFP12N10L					
100	40	0.040			RFP40N10LE	RFG40N10LE		RF1S40N10LE	RF1S40N10LESM	
120	2.0	1.750			RFP2N12L					
120	10	0.300			RFP10N12L					
150	2.0	1.750			RFP2N15L					
150	10	0.300			RFP10N15L					
180	2.0	3.500			RFP2N18L					
180	8.0	0.500			RFP8N18L					
200	2.0	3.500			RFP2N20L					
200	8.0	0.500			RFP8N20L					

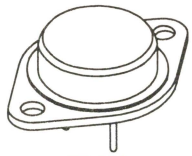
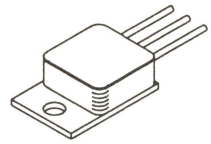
P-CHANNEL LOGIC LEVEL DEVICES

MAXIMUM RATINGS						
BV_{DSS} (V)	I_D (A)	$r_{DS(ON)}$ (Ω)	TO-251AA	TO-252AA	TO-220AB	MS-012AA
12	3.5/2.5	0.05/0.13 (COMP N&P)				RF1K49092
12	2.5	2 x 0.13				RF1K49093
30	10	0.200	RFD10P03L	RFD10P03LSM	RFP10P03L	
60	8	0.300	RFD8P06LE	RFD8P06LESM	RFP8P06LE	

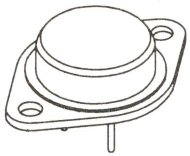
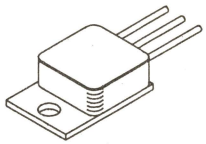
HERMETIC N-CHANNEL

MAXIMUM RATINGS			PACKAGE		
					
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	TO-204	TO-254AA
50	2.0	0.95	RFL2N05		
50	15.0	0.14		RFM15N05	
60	2.0	0.95	RFL2N06		
60	12.0	0.25		2N6755	
60	15.0	0.14		RFM15N06	
60	25.0	0.025			RFF70N06
60	33.0	0.08		IRF153	
60	40.0	0.055		IRF151	
80	1.0	1.2	RFL1N08		
80	3.0	0.8	IRFF113		
80	3.5	0.6	IRFF111		
80	5.0	0.4	IRFF123		
80	6.0	0.3	IRFF121		
80	7.0	0.25	IRFF133		
80	8.0	0.36		IRF123	
80	8.0	0.18	IRFF131		
80	9.2	0.27		IRF121	
80	12.0	0.23		IRF133	
80	12.0	0.2		RFM12N08	
80	14.0	0.16		IRF131	
80	18.0	0.1		RFM18N08	
80	25.0	0.1		IRF143	
80	28.0	0.077		IRF141	
100	1.0	1.2	RFL1N10		
100	3.0	0.8	IRFF112		
100	3.5	0.6	IRFF110		
100	3.5	0.6	2N6782 (Note 1)		
100	5.0	0.4	IRFF122		
100	6.0	0.3	2N6788 (Note 1)		
100	6.0	0.3	IRFF120		
100	7.0	0.25	IRFF132		
100	8.0	0.18	IRFF130		
100	8.0	0.36		IRF122	
100	8.0	0.18	2N6796 (Note 1)		

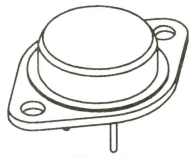
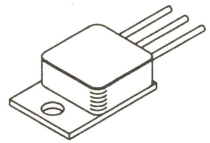
HERMETIC N-CHANNEL (Continued)

MAXIMUM RATINGS			PACKAGE		
					
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	TO-204	TO-254AA
100	9.2	0.27		IRF120	
100	12.0	0.2		RFM12N10	
100	12.0	0.23		IRF132	
100	14.0	0.16		IRF130	
100	14.0	0.18		2N6756 (Note 1)	
100	18.0	0.1		RFM18N10	
100	25.0	0.1		IRF142	
100	28.0	0.077		IRF140	
100	33.0	0.08		IRF152	
100	34.0	0.07			2N7224 (Notes 1, 2)
100	40.0	0.055		IRF150	
120	1.0	1.9	RFL1N12		
120	4.0	0.4	RFL4N12		
120	10.0	0.3		RFM10N12	
120	15.0	0.15		RFM15N12	
150	1.0	1.9	RFL1N15		
150	1.8	2.4	IRFF213		
150	2.2	1.5	IRFF211		
150	3.0	1.2	IRFF223		
150	3.5	0.8	IRFF221		
150	4.0	0.4	RFL4N15		
150	4.0	1.2		IRF223	
150	4.5	0.6	IRFF233		
150	5.0	0.8		IRF221	
150	5.5	0.4	IRFF231		
150	8.0	0.6		2N6757	
150	8.0	0.6		IRF233	
150	9.0	0.4		IRF231	
150	10.0	0.3		RFM10N15	
150	15.0	0.15		RFM15N15	
150	16.0	0.22		IRF243	
150	18.0	0.18		IRF241	
150	25.0	0.12		IRF253	
150	25.0	0.12		2N6765	

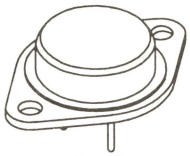
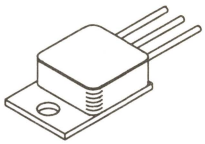
HERMETIC N-CHANNEL (Continued)

MAXIMUM RATINGS			PACKAGE		
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	 TO-204	 TO-254AA
150	30.0	0.085		IRF251	
180	1.0	3.65	RFL1N18		
180	12.0	0.25		RFM12N18	
200	1.0	3.65	RFL1N20		
200	1.8	2.4	IRFF212		
200	2.2	1.5	IRFF210		
200	2.3	1.5	2N6784 (Note 1)		
200	3.0	1.2	IRFF222		
200	3.5	0.8	2N6790 (Note 1)		
200	3.5	0.8	IRFF220		
200	4.0	1.2		IRF222	
200	4.5	0.6	IRFF232		
200	5.0	0.8		IRF220	
200	5.5	0.4	IRFF230		
200	5.5	0.4	2N6798 (Note 1)		
200	8.0	0.6		IRF232	
200	9.0	0.4		IRF230	
200	9.0	0.4		2N6758 (Note 1)	
200	12.0	0.25		RFM12N20	
200	16.0	0.22		IRF242	
200	18.0	0.18		IRF240	
200	25.0	0.12		IRF252	
200	27.4	0.1			2N7225 (Notes 1, 2)
200	30.0	0.085		2N6766 (Note 1)	
200	30.0	0.085		IRF250	
250	13.0	0.34		IRF245	
250	14.0	0.28		IRF244	
275	13.0	0.34		IRF247	
275	14.0	0.28		IRF246	
350	1.2	5	IRFF313		
350	1.4	3.6	IRFF311		
350	2.0	2.5	IRFF323		
350	2.5	1.8	IRFF321		
350	2.8	2.5		IRF323	

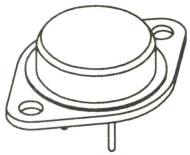
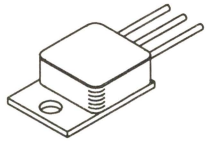
HERMETIC N-CHANNEL (Continued)

MAXIMUM RATINGS			PACKAGE		
					
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	TO-204	TO-254AA
350	3.0	1.5	IRFF333		
350	3.3	1.8		IRF321	
350	3.5	1	IRFF331		
350	4.0	2		RFM4N35	
350	4.5	1.5		2N6759	
350	4.5	1.5		IRF333	
350	5.5	1		IRF331	
350	7.0	0.75		RFM7N35	
350	8.3	0.8		IRF343	
350	10.0	0.55		IRF341	
350	12.0	0.5		RFM12N35	
350	12.0	0.4		2N6767	
350	13.0	0.4		IRF353	
350	15.0	0.3		IRF351	
400	1.2	5	IRFF312		
400	1.3	3.6	2N6786 (Note 1)		
400	1.4	3.6	IRFF310		
400	2.0	2.5	IRFF322		
400	2.0	1.8	2N6792 (Note 1)		
400	2.5	1.8	IRFF320		
400	2.8	2.5		IRF322	
400	3.0	1.5	IRFF332		
400	3.0	1	2N6800 (Note 1)		
400	3.3	1.8		IRF320	
400	3.5	1	IRFF330		
400	4.0	2		RFM4N40	
400	4.5	1.5		IRF332	
400	5.5	1		IRF330	
400	5.5	1		2N6760 (Note 1)	
400	7.0	0.75		RFM7N40	
400	8.3	0.8		IRF342	
400	10.0	0.55		IRF340	
400	12.0	0.5		RFM12N40	
400	13.0	0.4		IRF352	

HERMETIC N-CHANNEL (Continued)

MAXIMUM RATINGS			PACKAGE		
					
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	TO-204	TO-254AA
400	14.0	0.3		2N6768	
400	14.0	0.315			2N7227 (Notes 1, 2)
400	15.0	0.3		IRF350	
450	1.4	4	IRFF423		
450	1.6	3	IRFF421		
450	2.2	4		IRF423	
450	2.3	2	IRFF433		
450	2.5	3		IRF421	
450	2.8	1.5	IRFF431		
450	3.0	3		RFM3N45	
450	4.0	2		2N6761	
450	4.0	2		IRF433	
450	4.5	1.5		IRF431	
450	6.0	1.25		RFM6N45	
450	7.0	1.1		IRF443	
450	8.0	0.85		IRF441	
450	10.0	0.6		RFM10N45	
450	11.0	0.5		IRF453	
450	11.0	0.5		2N6769	
450	13.0	0.4		IRF451	
500	1.4	4	IRFF422		
500	1.5	3	2N6794 (Note 1)		
500	1.6	3	IRFF420		
500	2.2	4		IRF422	
500	2.3	2	IRFF432		
500	2.5	3		IRF420	
500	2.8	1.5	IRFF430		
500	3.0	3		RFM3N50	
500	3.5	1.5	2N6802 (Note 1)		
500	4.0	2		IRF432	
500	4.5	1.5		2N6762 (Note 1)	
500	4.5	1.5		IRF430	
500	7.0	1.1		IRF442	
500	8.0	0.85		IRF440	

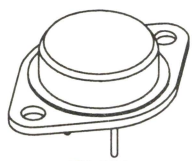
HERMETIC N-CHANNEL (Continued)

MAXIMUM RATINGS			PACKAGE		
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	 TO-204	 TO-254AA
500	8.3	0.8		BUZ45A	
500	9.6	0.6		BUZ45	
500	10.0	0.5		BUZ45B	
500	10.0	0.6		RFM10N50	
500	11.0	0.5		IRF452	
500	12.0	0.415			2N7228 (Notes 1, 2)
500	12.0	0.4		2N6770 (Note 1)	
500	13.0	0.4		IRF450	
600	5.4	1.6		IRFAC42	
600	6.2	1.2		IRFAC40	

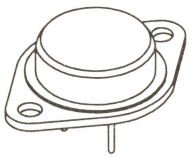
NOTES:

1. QPL Approved Type.
2. Avaliable in JANTX and JANTXV Reliability Levels only.

HERMETIC LOGIC LEVEL N-CHANNEL

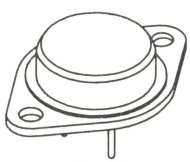
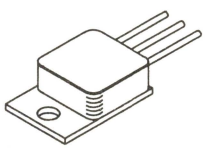
MAXIMUM RATINGS			PACKAGE	
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	 TO-204
50	2.0	0.95	RFL2N05L	
50	15.0	0.14		RFM15N05L
60	2.0	0.95	RFL2N06L	
60	15.0	0.14		RFM15N06L
80	1.0	1.2	RFL1N08L	
80	12.0	0.2		RFM12N08L
100	1.0	1.2	RFL1N10L	
100	1.7	1.4	2N6901 (Note)	
100	12.0	0.2		RFM12N10L
100	12.0	0.2		2N6902 (Note)
120	1.0	1.9	RFL1N12L	

HERMETIC LOGIC LEVEL N-CHANNEL (Continued)

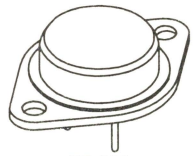
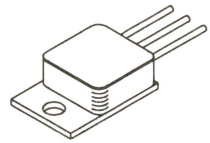
MAXIMUM RATINGS			PACKAGE	
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	 TO-204
120	10.0	0.3		RFM10N12L
150	1.0	1.9	RFL1N15L	
150	10.0	0.3		RFM10N15L
180	1.0	3.65	RFL1N18L	
180	8.0	0.5		RFM8N18L
200	1.0	3.65	2N6903 (Note)	
200	1.0	3.65	RFL1N20L	
200	8.0	0.6		2N6904 (Note)
200	8.0	0.5		RFM8N20L

NOTE: QPL Approved Type.

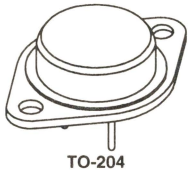
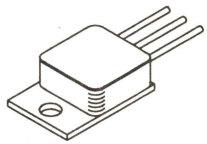
HERMETIC P-CHANNEL

MAXIMUM RATINGS			PACKAGE		
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	 TO-204	 TO-254AA
60	3.5	0.8	IRFF9123		
60	4.0	0.6	IRFF9121		
60	5.5	0.4	IRFF9133		
60	6.5	0.3	IRFF9131		
60	10.0	0.4		IRF9133	
60	12.0	0.3		IRF9131	
60	15.0	0.3		IRF9143	
60	19.0	0.2		IRF9141	
60	25.0	0.03			RFF60P06
60	25.0	0.15		IRF9151	
80	1.0	3.65	RFL1P08		
80	6.0	0.6		RFM6P08	
80	8.0	0.4		RFM8P08	

HERMETIC P-CHANNEL (Continued)

MAXIMUM RATINGS			PACKAGE		
					
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	TO-204	TO-254AA
80	12.0	0.3		RFM12P08	
80	25.0	0.15		RFK25P08	
100	1.0	3.65	RFL1P10		
100	1.2	3.65	2N6895 (Note)		
100	3.5	0.8	IRFF9122		
100	4.0	0.6	IRFF9120		
100	5.5	0.4	IRFF9132		
100	6.0	0.6		2N6896 (Note)	
100	6.5	0.3	IRFF9130		
100	6.5	0.3	2N6849 (Note)		
100	8.0	0.4		RFM8P10	
100	10.0	0.4		IRF9132	
100	11.0	0.3		2N6804	
100	12.0	0.3		RFM12P10	
100	12.0	0.3		IRF9130	
100	15.0	0.3		IRF9142	
100	19.0	0.2		IRF9140	
100	25.0	0.15		IRF9150	
100	25.0	0.15		RFK25P10	
100	25.0	0.2		2N6898 (Note)	
120	10.0	0.5		RFM10P12	
150	2.0	2.4	IRFF9223		
150	2.5	1.5	IRFF9221		
150	3.5	1.2	IRFF9233		
150	4.0	0.8	IRFF9231		
150	5.5	1.2		IRF9233	
150	6.5	0.8		IRF9231	
150	9.0	0.7		IRF9243	
150	10.0	0.5		RFM10P15	
150	11.0	0.5		IRF9241	
200	2.0	2.4	IRFF9222		

HERMETIC P-CHANNEL (Continued)

MAXIMUM RATINGS			PACKAGE		
BV_{DSS} (V)	I_{DS} (A)	$r_{DS(ON)}$ (Ω)	TO-205AF	 TO-204	 TO-254AA
200	2.5	1.5	IRFF9220		
200	3.5	1.2	IRFF9232		
200	4.0	0.8	IRFF9230		
200	4.0	0.8	2N6851 (Note)		
200	5.5	1.2		IRF9232	
200	6.5	0.8		IRF9230	
200	9.0	0.7		IRF9242	
200	11.0	0.5		IRF9240	

NOTE: QPL Approved Type.

Power MOS and SPICE Models

Features

- **Sub-Circuit Approach**
- **Full Operating Temperature Range**
- **Accurate Gate Charge Modelling**
- **BV_{DSS} Modelling at Low and High Currents**
- **Package Inductances**
- **Gate Series Resistance**
- **3rd Quadrant Diode**

Disk and User's Guide Available

MODELS AVAILABLE

FRK150	RF1K49156	RFD15P06, SM	RFM15N06	RFP60P03
FRK250	RF1K49157	RFD16N03L, SM	RFP8P06LE	RFP70N03
FRK254	RF1K49211	RFD16N05, SM	RFP10P03L	RFP70N06
FRL130	RF1K49221	RFD16N05L, SM	RFP14N05	RFP7N10LE
FRL230	RF1S25N06, SM	RFD16N06LE, SM	RFP14N05L	RFP8P06E
FSL130	RF1S30P05, SM	RFD3055, SM	RFP14N06	RLD03N06CLE, SM
FSL230	RF1S30P06, SM	RFD3055LE, SM	RFP14N06L	RLP03N06CLE
FSL234	RF1S40N10LE, SM	RFD7N10LE, SM	RFP15N06	RLP1N08LE
FSF150	RF1S42N03L, SM	RFD8P06E, SM	RFP15P05	RF1S23N06LE, SM
FSF250	RF1S45N03L, SM	RFF60P06	RFP15P06	RF1S45N06LE, SM
FSF254	RF1S45N06, SM	RFG30P05	RFP25N05	RF1S50N06LE, SM
FSF450	RF1S50N06, SM	RFG30P06	RFP25N06	RFD16N06, SM
FSS234	RF1S60P03, SM	RFG40N10LE	RFP3055	RFF70N06
IRFR/U9110	RF1S70N03, SM	RFG45N06	RFP3055LE	RFG45N06LE
IRFR/U9120	RF1S70N06, SM	RFG50N06	RFP30N06LE	RFP23N06LE
IRFR/U9220	RFA100N05E	RFG50N06LE	RFP30P05	RFP50N06LE
RF1K49086	RFD3N08L, SM	RFG60P03	RFP30P06	RFD15N06LE, SM
RF1K49088	RFD8P06LE, SM	RFG60P05E	RFP40N10LE	RF1S30N06LE, SM
RF1K49090	RFD10P03L, SM	RFG60P06E	RFP42N03L	RFD14N05L, SM
RF1K49092N	RFD14N05, SM	RFG70N06	RFP45N03L	RFD14N06L, SM
RF1K49092P	RFD14N06, SM	RFG75N05E	RFP45N06	RFP45N06LE
RF1K49093	RFD15P05, SM	RFH75N05E	RFP50N06	

SPICE Models

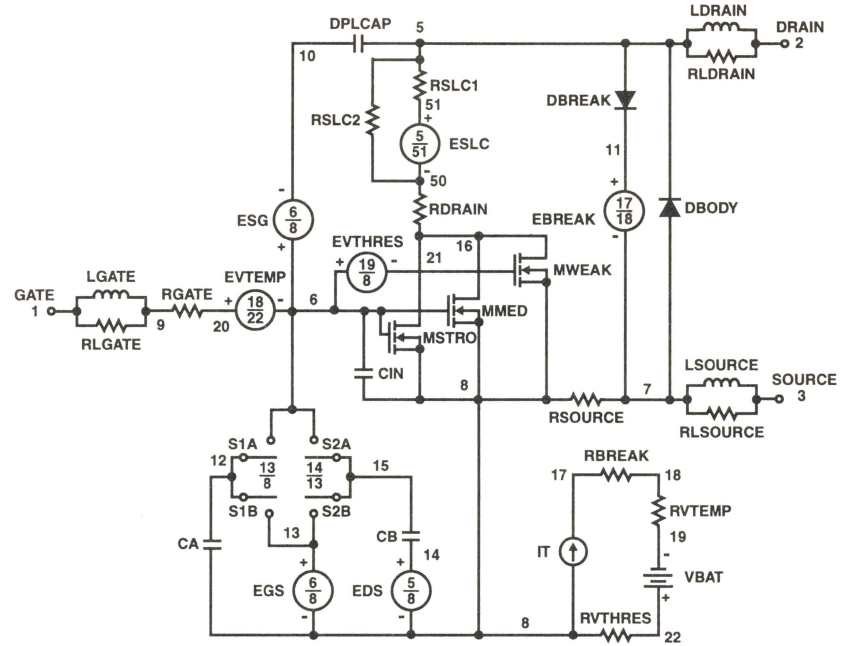


FIGURE 1. N-MOS NO ESD

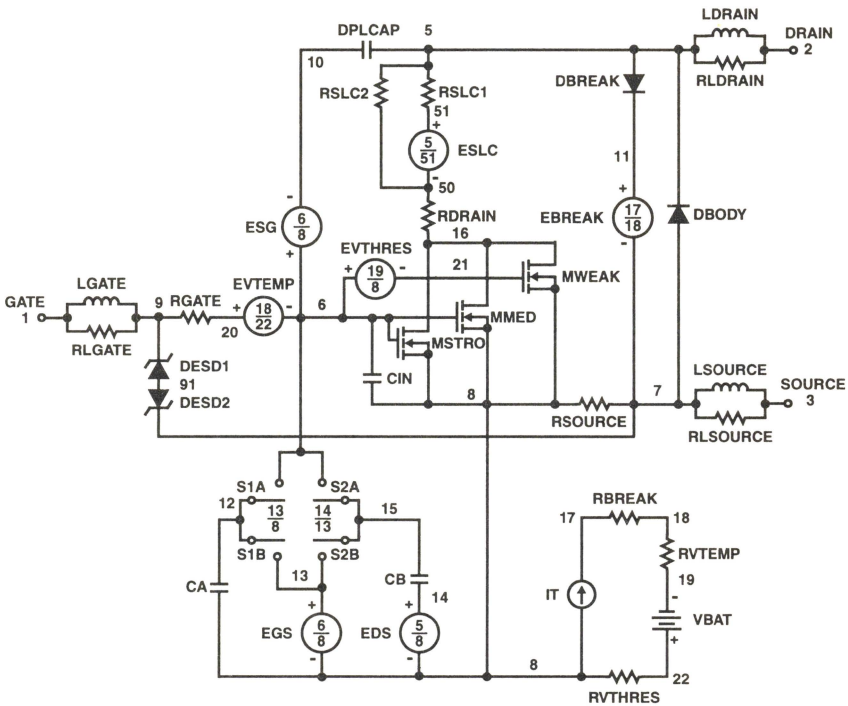


FIGURE 2. N-MOS ESD

SPICE Models (Continued)

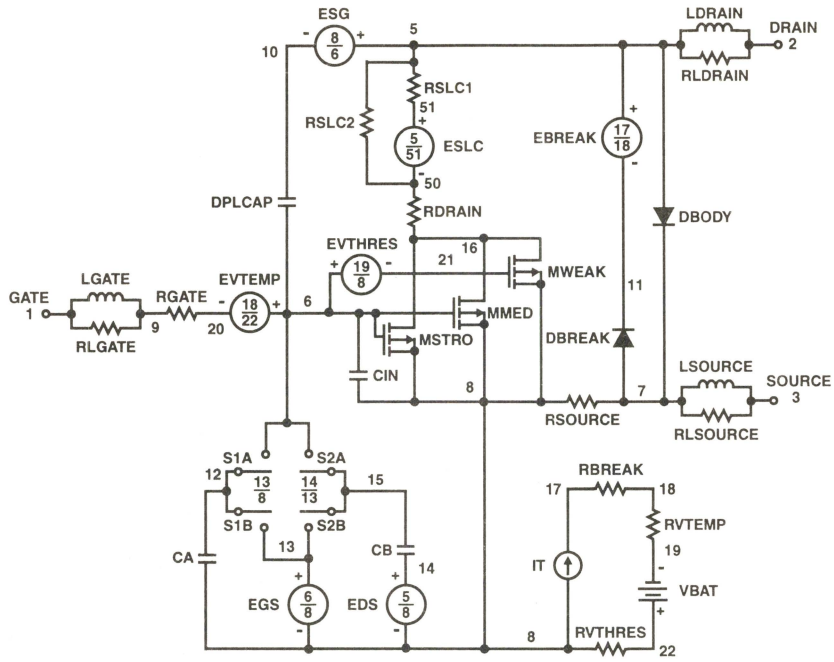


FIGURE 3. P-MOS NO ESD

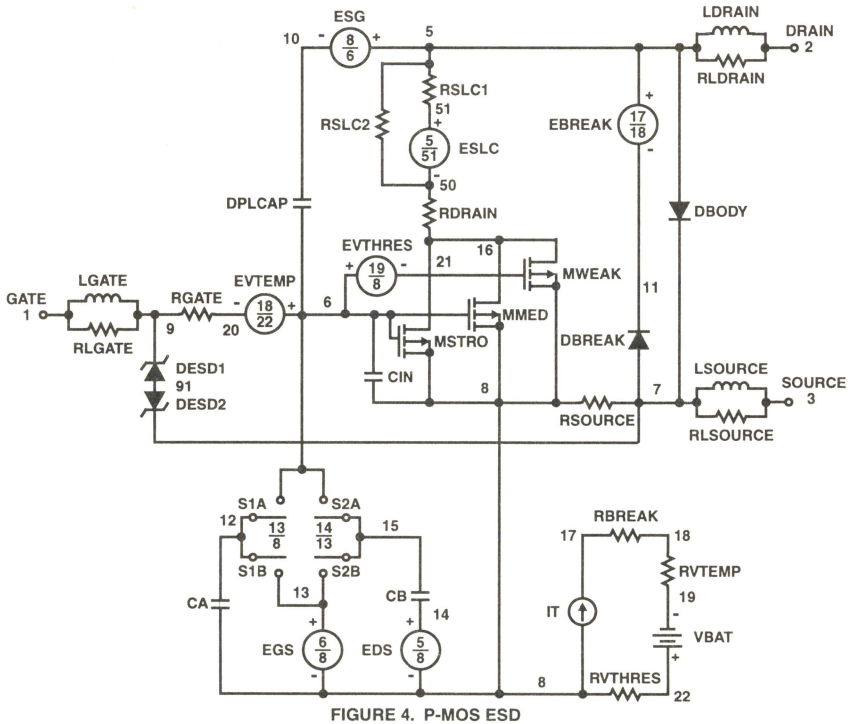


FIGURE 4. P-MOS ESD

INSULATED GATE BIPOLAR TRANSISTORS

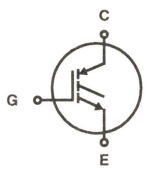
IGBTs FOR SWITCHING APPLICATIONS AND MOTOR CONTROL

Features

- Better Die Area Efficiency than MOSFETs in High Voltage Applications
- No Body Diode
- Gate Drive: Voltage Driven, Not Current
- Surface Mount Packages

Applications

- Off Line SMPS
- Uninterruptable Power Supplies (UPS)
- High Voltage Motor Drives
- Synchronous Converters
- Deflection Circuits
- AC Switches



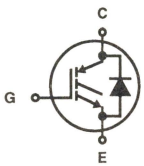
IGBTs WITH INTEGRAL REVERSE DIODE

Features

- Identical IGBT Specifications
- Ultra Fast Diode or Hyper Fast Diode Added In Same Package
- 35ns to 100ns Recovery
- Soft Recovery Minimizes RFI
- Up to 1200V Breakdown

Applications

- Motor Drives
- Motor Brake
- SMPS
- Welders



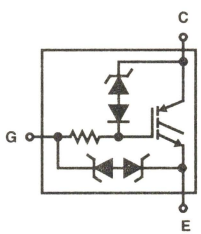
IGBTs WITH VOLTAGE CLAMPING

Features

- Collector-Gate Voltage Clamping
- ESD Protection
- Logic Level Gate

Applications

- Automotive Ignition Systems
- Power Solenoid Control
- Motor Control



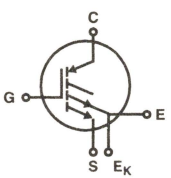
IGBTs WITH CURRENT SENSE

Features

- Sense Current Output a Ratio of Total Emitter Current
- Kelvin Contact To Minimize Control Loop Interface
- 5 Lead TO-220 Package

Applications

- Feedback Motor Controls
- Current Sources
- Power Amplifiers

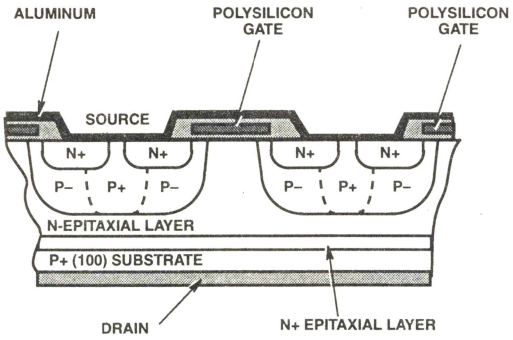


CHARACTERISTICS OF A POWER MOSFET AND A BIPOLAR TRANSISTOR

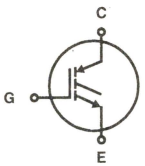
Features

- Voltage Gated
  - Requires Small Gate Power, Similar to Standard Power MOSFET
- Turn-Off
  - Turns Off When Gate Drive is Removed
- On-State Voltage Drop
  - Nonlinear, Temperature Independent, Unlike the Typical 2X Variation of a Power MOSFET
- Turn-On Speed
  - Fast! Comparable to a Standard Power MOSFET
- Turn-Off Speed
  - Capable of 50kHz Switching Without Derating
  - UFS B Series Less Than 200ns t_{fi}

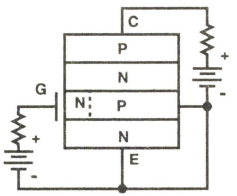
Cross Section of Chip Structure



Schematic Symbol



Junction Diagram Showing Biasing Arrangements

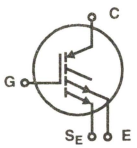


CURRENT SENSING IGBT

Features

- Built-In Current Sensing Function to be Used as a Feed-back Signal for Control and/or Protection
- I_C at T_J = 100°C = 12A, BV_{CES} = 600V, $V_{CE(ON)}$ = 2.7 Max at I_{CE} = 10A
- Sense Voltage at I_{CE} = 10A, R_{SENSE} = 2K, 1.4V to 1.8V

Terminal Diagram



IGBT Ordering Nomenclature

HGT TYPES

HGT - G - 12 - N - 60 - D - 1 - D

HARRIS IGBT

PACKAGE DESIGNATOR
- A: 5 Lead TO-218 (MO-093AA)
- P: 3 Lead TO-220
- G: 3 Lead TO-247
- H: 3 Lead TO-218
- D: TO-251/TO-252 (D-PAK)
- 1S: TO-262/TO-263 (D^2-PAK)
- B: 5 LEAD TO-220 (TS-001AA)

CONTINUOUS CURRENT RATING

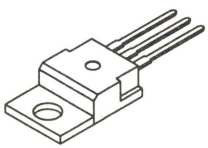
POLARITY
N-Channel or P-Channel

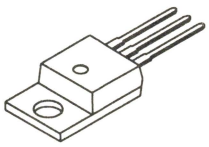
VOLTAGE BREAKDOWN/10
i.e., (40, 50, 60, 100, 120)

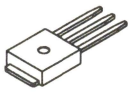
MAX FALL TIME
- A: ≤100ns
- B: ≤200ns
- C: ≤500ns
- D: ≤750ns
- E: ≤1μs
- F: ≤2μs
- G: ≤55μs

1: First Generation
2: Second Generation
3: Third Generation

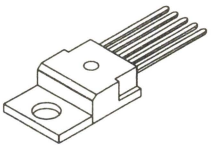
SUFFIX
- L: Logic Level Gate
- D: Integral Reverse Diode
- S: Surface Mount
- C: Current Sense
- V: Voltage Clamping
- R: Rugged
- 9A: Tape and Reel TO-252 or TO-263

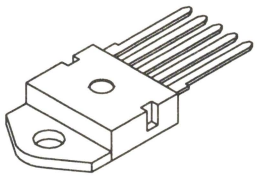

TO-220AB

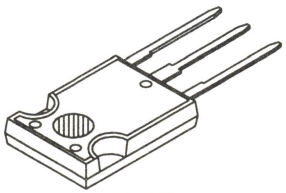

TO-220AB (ALTERNATE PACKAGE)

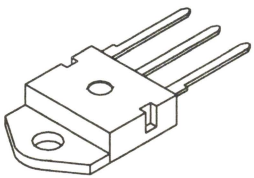

TO-251AA

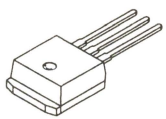
TO-252AA

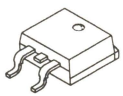

TS-001AA


MO-093AA

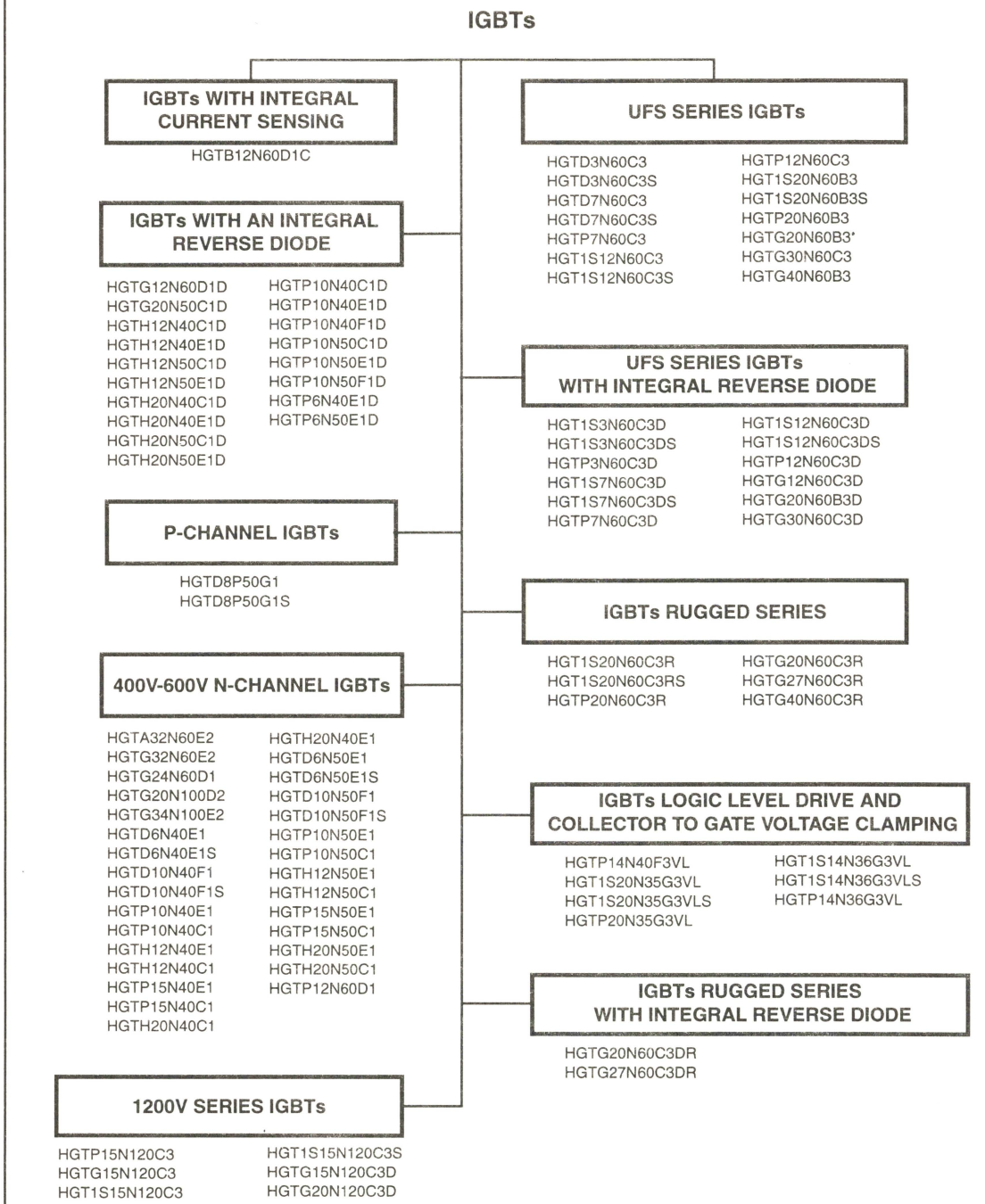

TO-247


TO-218AC


TO-262

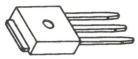
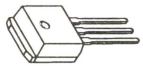
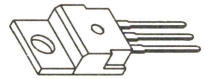
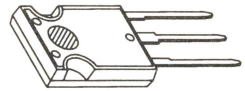

TO-263

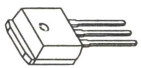
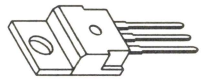
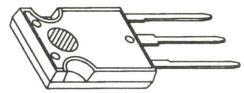
IGBT Product Selection Tree

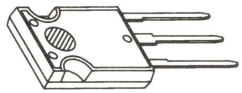


600V UFS SERIES IGBTs

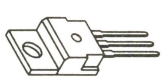
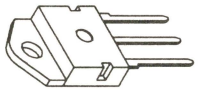
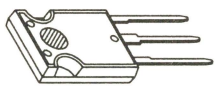
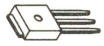
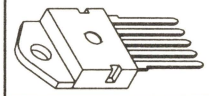
$V_{CE(SAT)}$: Maximum at $T_J = 25^oC$, $I_{CE} = I_{C110}$, and $V_{GE} = 15V$
E_{OFF}: Typical at $T_J = 150^oC$, $I_{CE} = I_{C110}$, and $V_{CE(PK)} = 480V$

	 TO-251AA (D-PAK)	TO-252AA (D-PAK)	 TO-262AA (D^2-PAK)	TO-263AB (D^2-PAK)	 TO-220AB	 TO-247
I_C AT 110°C	600V 275ns UFS	600V 275ns UFS	600V 275ns UFS	600V 275ns UFS	600V 275ns UFS	600V 275ns UFS
3A	HGTD3N60C3 2.0V 245µJ	HGTD3N60C3S 2.0V 245µJ	HGT1S3N60C3D 2.0V 245µJ	HGT1S3N60C3DS 2.0V 245µJ	HGTP3N60C3D 2.0V 245µJ	
7A	HGTD7N60C3 2.0V 600µJ	HGTD7N60C3S 2.0V 600µJ	HGT1S7N60C3D 2.0V 600µJ	HGT1S7N60C3DS 2.0V 600µJ	HGTP7N60C3 HGTP7N60C3D 2.0V 600µJ	
12A			HGT1S12N60C3 HGT1S12N60C3D 2.0V 900µJ	HGT1S12N60C3S HGT1S12N60C3DS 2.0V 900µJ	HGTP12N60C3 HGTP12N60C3D 2.0V 900µJ	HGTG12N60C3D 2.0V 900µJ

	 TO-262AA (D^2-PAK)		TO-263AB (D^2-PAK)		 TO-220AB		 TO-247	
I_C AT 110°C	600V 200ns UFS	600V RUGGED UFS	600V 200ns UFS	600V RUGGED UFS	600V 200ns UFS	600V RUGGED UFS	600V 200ns UFS	600V RUGGED UFS
20A	HGT1S20N60B3 2.0V 1050µJ	HGT1S20N60C3R 2.2V 3000µJ	HGT1S20N60B3S 2.0V 1050µJ	HGT1S20N60C3RS 2.2V 3000µJ	HGTP20N60B3 2.0V 1050µJ	HGTP20N60C3R 2.2V 3000µJ	HGTG20N60B3 HGTG20N60B3D 2.0V 1050µJ	HGTG20N60C3R HGTG20N60C3DR 2.2V 3000µJ

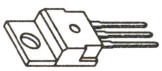
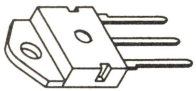
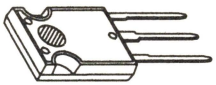
	 TO-247		
I_C AT 110°C	600V 275ns UFS	600V 200ns UFS	600V RUGGED UFS
27A			HGTG27N60C3R HGTG27N60C3DR 2.2V 2000µJ
30A	HGTG30N60C3 HGTG30N60C3D 1.8V 2500µJ		
40A		HGTG40N60B3 2.0V 2500µJ	HGTG40N60C3R 2.2V 2500µJ

HARRIS IGBT PRODUCT LINE

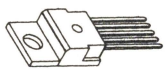
MAXIMUM RATINGS									
BV_{CES} (V)	I_{C90} (A)	I_{CM} (A)	t_f (μs)	TO-220AB	TO-218AC	TO-247	TO-251AA	TO-252AA	MO-093AA
400	6	7.5	1.0				HGTD6N40E1	HGTD6N40E1S	
	10	12	1.2				HGTD10N40F1	HGTD10N40F1S	
	10	17.5	1.0	HGTP10N40E1					
			0.5	HGTP10N40C1					
	12	17.5	1.0		HGTH12N40E1				
			0.5		HGTH12N40C1				
	15	35	1.0	HGTP15N40E1					
			0.5	HGTP15N40C1					
	20	35	1.0		HGTH20N40E1				
			0.5		HGTH20N40C1				
500	6	7.5	1.0				HGTD6N50E1	HGTD6N50E1S	
	10	12	1.2				HGTD10N50F1	HGTD10N50F1S	
	10	17.5	1.0	HGTP10N50E1					
			0.5	HGTP10N50C1					
	12	17.5	1.0		HGTH12N50E1				
			0.5		HGTH12N50C1				
	15	35	1.0	HGTP15N50E1					
			0.5	HGTP15N50C1					
	20	35	1.0		HGTH20N50E1				
			0.5		HGTH20N50C1				
600	12	48	0.6	HGTP12N60D1					
	24	96	0.6			HGTG24N60D1			
	32	200	0.8			HGTG32N60E2			HGTA32N60E2
1000	20	100	0.68			HGTG20N100D2			
	34	200	0.87			HGTG34N100E2			

NOTE: I_{C90} = maximum continuous current rating at $T_C = 90^oC$; I_{CM} = maximum pulsed current rating; t_f measured at $T_C = 150^oC$.

HARRIS IGBTs WITH AN INTEGRAL REVERSE DIODE

MAXIMUM RATINGS						
BV_{CES} (V)	I_{C90} (A)	I_{CM} (A)	t_f (μs) (NOTE 5)	TO-220AB	TO-218AC	TO-247
400	6	7.5	1.0	HGTP6N40E1D		
	10	12	1.2	HGTP10N40F1D		
	10	17.5	1.0	HGTP10N40E1D		
			0.5	HGTP10N40C1D		
	12	17.5	1.0		HGTH12N40E1D	
			0.5		HGTH12N40C1D	
	20	35	1.0		HGTH20N40E1D (Note 3)	
			0.5		HGTH20N40C1D (Note 3)	
500	6	7.5	1.0	HGTP6N50E1D		
	10	12	1.2	HGTP10N50F1D		
	10	17.5	1.0	HGTP10N50E1D		
			0.5	HGTP10N50C1D		
	12	17.5	1.0		HGTH12N50E1D	
			0.5		HGTH12N50C1D	
	20	35	1.0		HGTH20N50E1D (Note 3)	
			0.5		HGTH20N50C1D (Note 3)	HGTG20N50C1D (Note 3)
600	12	48	0.6			HGTG12N60D1D

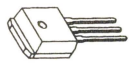
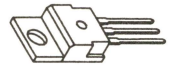
HARRIS IGBTs WITH INTEGRAL CURRENT SENSING

MAXIMUM RATINGS				
BV_{CES} (V)	I_{C90} (A)	I_{CM} (A)	t_f (μs) (NOTE 4)	TS-001AA (5 LEAD TO-220)
600	12	40	1.0	HGTB12N60D1C

NOTES:

1. I_{C90} = maximum continuous current rating at $T_C = 90^oC$.
2. I_{CM} = maximum pulsed current rating.
3. t_f measured at $T_C = 100^oC$.
4. t_f measured at $T_C = 125^oC$.
5. t_f measured at $T_C = 150^oC$.

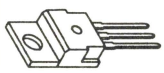
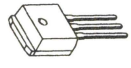
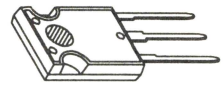
HARRIS IGBTs FEATURING LOGIC LEVEL DRIVE AND COLLECTOR TO GATE VOLTAGE CLAMPING

MAXIMUM RATINGS								
BV_{CLAMP} (V)	I_{C100} (A)	$V_{CE(SAT)}$ (A)	R_G (TYP) (Ω)	R_{GE} (Ω)	INDUCTIVE USE TEST (A)	TO-262AA	TO-263AB	TO-220AB
350-420	14 at 90°C	2 at 10A, 4.5V	1K	None	17 at L = 2.3mHy			HGTP14N40F3VL
320-390	20	1.6 at 10A, 4.5V	1K	12K-24K	26 at L = 2.3mHy	HGT1S20N35G3VL	HGT1S20N35G3VLS	HGTP20N35G3VL
330-390	14	1.45 at 7A, 4.5V	75	10K-30K	17 at L = 2.3mHy	HGT1S14N36G3VL	HGT1S14N36G3VLS	HGTP14N36G3VL

NOTE:

1. I_{C100} = maximum continuous current rating at T_C = 100°C.

1200V SERIES IGBT PRODUCT LINE

MAXIMUM RATINGS							
BV_{CE} (V)	I_{C110} (A)	$V_{CE(SAT)}$ (A)	t_f (μs)	TO-220AB	TO-262AA	TO-263AB	TO-247
1200	15	3.5	0.4	HGTP15N120C3	HGT1S15N120C3	HGT1S15N120C3S	HGTG15N120C3
1200	15	3.5	0.4				HGTG15N120C3D
1200	20	3.5	0.4				HGTG20N120C3D

NOTES:

1. $V_{CE(SAT)}$ = maximum at T_J = 25°C, I_{CE} = I_C110, V_{GE} = 15V.
2. t_f = maximum at T_J = 150°C, I_{CE} = I_C110, V_{GE} = 15V.

RECTIFIERS 9

PRODUCT SELECTION GUIDE

PAGE

Rectifiers 9-3

Rectifier Ordering Nomenclature 9-4

RUR, RHR TYPES 9-4

MUR TYPES 9-4

BYW51 TYPES 9-4

Rectifier Product Selection Tree 9-5

Rectifier Selection Guide 9-6

HARRIS ULTRAFAST RECOVERY RECTIFIER PRODUCT LINE 9-6

HARRIS DUAL ULTRAFAST RECOVERY RECTIFIER PRODUCT LINE 9-7

HARRIS HYPERFAST RECOVERY RECTIFIER PRODUCT LINE 9-8

HARRIS DUAL HYPERFAST RECOVERY RECTIFIER PRODUCT LINE 9-9

HARRIS RECTIFIER FAMILIES

Definitions

Rectifier

A rectifier allows current flow in one direction only. The difference between a Diode and a Rectifier is that a Rectifier is usually rated at a breakdown voltage of greater than 50V and has a power rating that is greater than 0.5W.

HYPERFAST AND ULTRAFAST RECOVERY RECTIFIERS

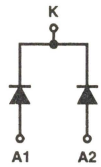
Features

- 25ns to 200ns Reverse Recovery Time
- Reverse Voltage Range Between 50V to 1200V
- Current Peak (I_{FSM}) Handling Capability Rated
- Single or Dual Rectifier Style Available
- Various Package Styles Including Surface Mount TO-252 Singles and Duals

Applications

- Power Supplies in the 100kHz - 500kHz Switching Range

SINGLE



DUAL

NOTE: A = Anode, K = Cathode

Rectifier Ordering Nomenclature

RUR, RHR TYPES

XXX X XX XXX XX

ULTRAFAST AND HYPERFAST REVERSE RECOVERY DIODE
RUR: Ultrafast
RHR: Hyperfast

PACKAGE
P: 2 and 3 Lead TO-220
G: 2 and 3 Lead TO-247
H: 2 and 3 Lead TO-218
M: TO-204AA
D: 2 and 3 Lead TO-251/TO-252
U: 1 Lead TO-218

CONTINUOUS CURRENT RATING
8: 8A
50: 50A
150: 150A

VOLTAGE RATING/10
i.e., 05 = 50V, 10 = 100V, 20 = 200V, etc.

SUFFIX
CC: Common Cathode Dual
S: Surface Mount Lead Form (TO-252)
9A: Tape and Reel

MUR TYPES

MUR XX XX PT/CT

DEVICE FAMILY
Rectifiers

CURRENT RATING
i.e., 8 = 8A
30 = 30A

VOLTAGE RATING/10
i.e., 20 = 200V
120 = 1200V

CT: TO-220AB - Dual Common Cathode Part
PT: TO-247 - Dual Common Cathode Part
Blank: TO-220AC - Single Diode

BYW51 TYPES

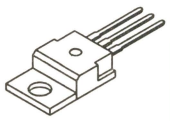
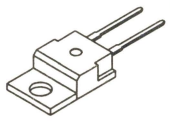
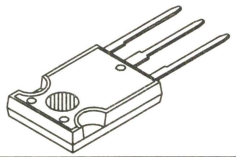
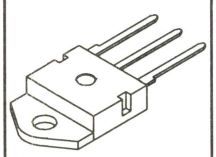
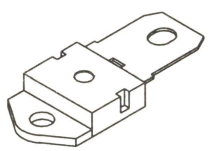
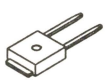
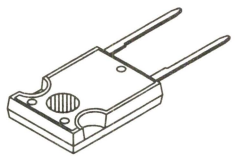
BYW51 XXX

DEVICE FAMILY
Dual Ultra-Fast Recovery Rectifier

VOLTAGE RATING
100 = 100V
200 = 200V

PACKAGE STYLES

HARRIS RECTIFIER PREFIXES BYW, MUR, RUR, RHR

TO-220AB	TO-220AC	TO-247	TO-218AC	TO-218 (Single Lead)
				
TO-251AA	TO-251 (Two Lead)	TO-247 (Two Lead)	TO-252AA	TO-252 (Two Lead)
				

Rectifier Product Selection Tree

RECTIFIER PRODUCT LINE

ULTRAFAST RECOVERY

MUR1510
MUR1515
MUR1520
MUR1540
MUR1550
MUR1560
MUR810
MUR8100E
MUR815
MUR820
MUR840
MUR850
MUR860
MUR870E
MUR880E
MUR890E
RURD410
RURD410S
RURD4120
RURD4120S
RURD415
RURD415S
RURD420
RURD420S
RURD440
RURD440S
RURD450
RURD450S
RURD460
RURD460S
RURD610
RURD610S
RURD6120
RURD6120S
RURD615
RURD615S
RURD620
RURD620S
RURD640
RURD640S
RURD650
RURD650S
RURD660
RURD660S
RURD840
RURD840S
RURD850
RURD850S
RURD860
RURD860S
RURG3010
RURG30100
RURG30120
RURG3015
RURG3020
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RURG8060
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RURP840
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RURU10060
RURU150100
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RURU15040
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RURU15070
RURU15080
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RURU5040
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RURU5060
RURU5070
RURU5080
RURU5090
RURU75120
RURU80100
RURU8040
RURU8050
RURU8060
RURU8070
RURU8080
RURU8090

DUAL ULTRAFAST RECOVERY

BYW51100
BYW51150
BYW51200
MUR1610CT
MUR1615CT
MUR1620CT
MUR3010PT
MUR3015PT
MUR3020PT
MUR3040PT
MUR3050PT
MUR3060PT
RURD410CC
RURD410CCS
RURD415CC
RURD415CCS
RURD420CC
RURD420CCS
RURD440CC
RURD440CCS
RURD450CC
RURD450CCS
RURD460CC
RURD460CCS
RURD610CC
RURD610CCS
RURD615CC
RURD615CCS
RURD620CC
RURD620CCS
RURG15100CC
RURG1510CC
RURG15120CC
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RURG30120CC
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RURP860CC
RURP870CC
RURP880CC
RURP890CC

HYPERFAST RECOVERY

RHRD4120
RHRD4120S
RHRD440
RHRD440S
RHRD450
RHRD450S
RHRD460
RHRD460S
RHRD6120
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RHRU5070
RHRU5080
RHRU5090
RHRU75100
RHRU75120
RHRU7540
RHRU7550
RHRU7560
RHRU7570
RHRU7580
RHRU7590

DUAL HYPERFAST RECOVERY

RHRD440CC
RHRD440CCS
RHRD450CC
RHRD450CCS
RHRD460CC
RHRD460CCS
RHRD15100CC
RHRD1540CC
RHRD1550CC
RHRG1560CC
RHRG1570CC
RHRG1580CC
RHRG1590CC
RHRG30100CC
RHRG30120CC
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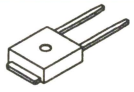
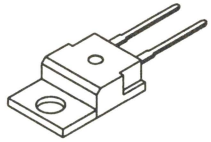
HARRIS ULTRAFAST RECOVERY RECTIFIER PRODUCT LINE



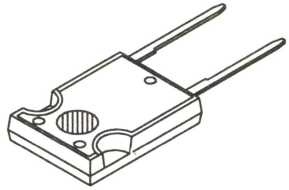
TO-251

TO-252

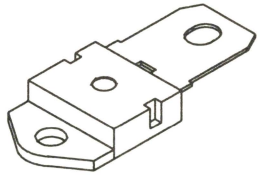
NOTE: The TO-252 is designated by "S" suffix.



TO-220AC



2 LEAD TO-247

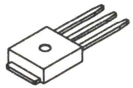


SINGLE LEAD TO-218

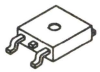
	$I_{F(AVG)}$			$I_{F(AVG)}$			$I_{F(AVG)}$			$I_{F(AVG)}$			
V_{RRM}	4A	6A	8A	8A	15A	30A	30A	50A	75A/80A	50A	75A/80A	100A	150A
100V	RURD410 RURD410S 1.0V 35ns	RURD610 RURD610S 1.0V 35ns		MUR810 RURP810 0.975V 35ns†	MUR1510 RURP1510 1.05V 35ns	RURP3010 1.0V 50ns	RURG3010 1.0V 50ns						
150V	RURD415 RURD415S 1.0V 35ns	RURD615 RURD615S 1.0V 35ns		MUR815 RURP815 0.975V 35ns†	MUR1515 RURP1515 1.05V 35ns	RURP3015 1.0V 50ns	RURG3015 1.0V 50ns						
200V	RURD420 RURD420S 1.0V 35ns	RURD620 RURD620S 1.0V 35ns		MUR820 RURP820 .95V 35ns†	MUR1520 RURP1520 1.05V 35ns	RURP3020 1.0V 50ns	RURG3020 1.0V 50ns						
400V	RURD440 RURD440S 1.5V 60ns	RURD640 RURD640S 1.5V 60ns	RURD840 RURD840S 1.5V 70ns	MUR840 RURP840 1.3V 60ns†	MUR1540 RURP1540 1.25V 60ns	RURP3040 1.5V 60ns	RURG3040 1.5V 60ns	RURG5040 1.6V 75ns	RURG8040 1.6V 85ns	RURU5040 1.6V 75ns	RURU8040 1.6V 85ns	RURU10040 1.6V 100ns	RURU15040 1.6V 100ns
500V	RURD450 RURD450S 1.5V 60ns	RURD650 RURD650S 1.5V 60ns	RURD850 RURD850S 1.5V 70ns	MUR850 RURP850 1.5V 60ns†	MUR1550 RURP1550 1.5V 60ns	RURP3050 1.5V 60ns	RURG3050 1.5V 60ns	RURG5050 1.6V 75ns	RURG8050 1.6V 85ns	RURU5050 1.6V 75ns	RURU8050 1.6V 85ns	RURU10050 1.6V 100ns	RURU15050 1.6V 100ns
600V	RURD460 RURD460S 1.5V 60ns	RURD660 RURD660S 1.5V 60ns	RURD860 RURD860S 1.5V 70ns	MUR860 RURP860 1.5V 60ns†	MUR1560 RURP1560 1.5V 60ns	RURP3060 1.5V 60ns	RURG3060 1.5V 60ns	RURG5060 1.6V 75ns	RURG8060 1.6V 85ns	RURU5060 1.6V 75ns	RURU8060 1.6V 85ns	RURU10060 1.6V 100ns	RURU15060 1.6V 100ns
700V				MUR870E RURP870 1.8V 110ns	RURP1570 1.8V 125ns	RURP3070 1.8V 150ns	RURG3070 1.8V 150ns	RURG5070 1.9V 200ns	RURG8070 1.9V 200ns	RURU5070 1.9V 200ns	RURU8070 1.9V 200ns		RURU15070 1.9V 200ns
800V				MUR880E RURP880 1.8V 110ns	RURP1580 1.8V 125ns	RURP3080 1.8V 150ns	RURG3080 1.8V 150ns	RURG5080 1.9V 200ns	RURG8080 1.9V 200ns	RURU5080 1.9V 200ns	RURU8080 1.9V 200ns		RURU15080 1.9V 200ns
900V				MUR890E RURP890 1.8V 110ns	RURP1590 1.8V 125ns	RURP3090 1.8V 150ns	RURG3090 1.8V 150ns	RURG5090 1.9V 200ns	RURG8090 1.9V 200ns	RURU5090 1.9V 200ns	RURU8090 1.9V 200ns		RURU15090 1.9V 200ns
1000V				MUR8100E RURP8100 1.8V 110ns	RURP15100 1.8V 125ns	RURP30100 1.8V 150ns	RURG30100 1.8V 150ns	RURG50100 1.9V 200ns	RURG80100 1.9V 200ns	RURU50100 1.9V 200ns	RURU80100 1.9V 200ns		RURU150100 1.9V 200ns
1200V	RURD4120 RURD4120S 2.1V 90ns	RURD6120 RURD6120S 2.1V 90ns		RURP8120 2.1V 110ns	RURP15120 2.1V 130ns	RURP30120 2.1V 150ns	RURG30120 2.1V 150ns	RURG50120 2.1 200ns	RURG75120 2.1V 200ns	RURU50120 2.1V 200ns	RURU75120 2.1V 200ns	RURU100120 2.1V 200ns	RURU150120 2.1V 200ns

NOTE: V_F at $I_{F(AVG)}$, $T_J = 25^oC$; t_{rr} at $I_{F(AVG)}$, dI_F/dt = 100A/µs or 200A/µs, $T_J = 25^oC$; † t_{rr} at I_F = 1A.

HARRIS DUAL ULTRAFAST RECOVERY RECTIFIER PRODUCT LINE

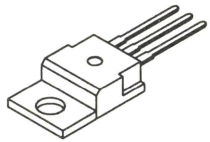


TO-251AA

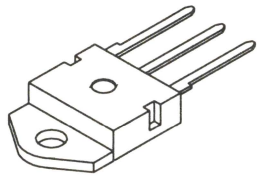


TO-252AA

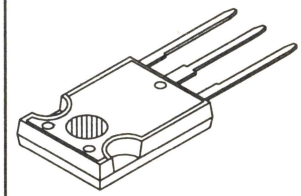
NOTE: The TO-252AA is designated by "S" suffix.



TO-220AB



TO-218

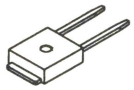
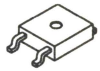
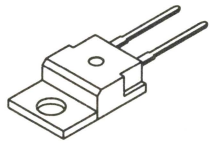
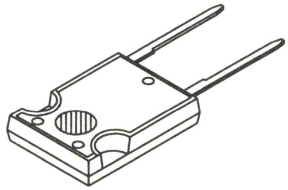
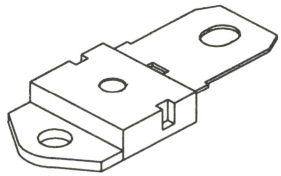


TO-247

		$I_{F(AVG)}$	$I_{F(AVG)}$			$I_{F(AVG)}$		$I_{F(AVG)}$	
V_{RRM}	4Ax2	6Ax2	4Ax2	6Ax2	8Ax2	15Ax2	30Ax2	15Ax2	30Ax2
100V	RURD410CC RURD410CCS 1.0V 35ns	RURD610CC RURD610CCS 1.0V 35ns			BYW51100 0.95V 35ns† MUR1610CT RURP810CC 0.975V 35ns	MUR3010PT RURH1510CC 1.05V 35ns	RURH3010CC 1.0V 50ns	RURG1510CC 1.05V 35ns	RURG3010CC 1.0V 50ns
150V	RURD415CC RURD415CCS 1.0V 35ns	RURD615CC RURD615CCS 1.0V 35ns			BYW51150 0.95V 35ns† MUR1615CT RURP815CC 0.975V 35ns	MUR3015PT RURH1515CC 1.05V 35ns	RURH3015CC 1.0V 50ns	RURG1515CC 1.05V 35ns	RURG3015CC 1.0V 50ns
200V	RURD420CC RURD420CCS 1.0V 35ns	RURD620CC RURD620CCS 1.0V 35ns			BYW51200 0.95V 35ns† MUR1620CT RURP820CC 0.975V 35ns	MUR3020PT RURH1520CC 1.05V 35ns	RURH3020CC 1.0V 50ns	RURG1520CC 1.05V 35ns	RURG3020CC 1.0V 50ns
400V	RURD440CC RURD440CCS 1.5V 60ns			RURP640CC 1.5V 60ns	RURP840CC 1.3V 70ns	MUR3040PT RURH1540CC 1.25V 60ns	RURH3040CC 1.5V 60ns	RURG1540CC 1.5V 60ns	RURG3040CC 1.5V 60ns
500V	RURD450CC RURD450CCS 1.5V 60ns			RURP650CC 1.5V 60ns	RURP850CC 1.5V 70ns	MUR3050PT RURH1550CC 1.25V 60ns	RURH3050CC 1.5V 60ns	RURG1550CC 1.5V 60ns	RURG3050CC 1.5V 60ns
600V	RURD460CC RURD460CCS 1.5V 60ns			RURP660CC 1.5V 60ns	RURP860CC 1.5V 70ns	MUR3060PT RURH1560CC 1.25V 60ns	RURH3060CC 1.5V 60ns	RURG1560CC 1.5V 60ns	RURG3060CC 1.5V 60ns
700V					RURP870CC 1.8V 100ns	RURH1570CC 1.8V 125ns	RURH3070CC 1.8V 150ns	RURG1570CC 1.5V 125ns	RURG3070CC 1.5V 150ns
800V					RURP880CC 1.8V 100ns	RURH1580CC 1.8V 125ns	RURH3080CC 1.8V 150ns	RURG1580CC 1.5V 125ns	RURG3080CC 1.5V 150ns
900V					RURP890CC 1.8V 100ns	RURH1590CC 1.8V 125ns	RURH3090CC 1.8V 150ns	RURG1590CC 1.5V 125ns	RURG3090CC 1.5V 150ns
1000V					RURP8100CC 1.8V 100ns	RURH15100CC 1.8V 125ns	RURH30100CC 1.8V 150ns	RURG15100CC 1.5V 125ns	RURG30100CC 1.5V 150ns
1200V			RURP4120CC 2.1V 90ns	RURP6120CC 2.1V 90ns	RURP8120CC 2.1V 110ns			RURG15120CC 2.1V 130ns	RURG30120CC 2.1 150ns

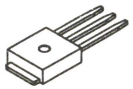
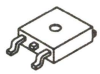
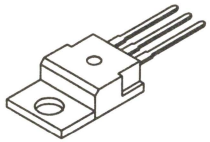
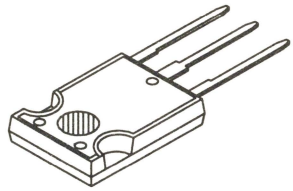
NOTE: V_F at $I_{F(AVG)}$, $T_J = 25^oC$; t_{rr} at $I_{F(AVG)}$, dI_F/dt = 100A/µs or 200A/µs, $T_J = 25^oC$; † t_{rr} at I_F = 1A.

HARRIS HYPERFAST RECOVERY RECTIFIER PRODUCT LINE

	 TO-251  TO-252 NOTE: The TO-252 is designated by "S" suffix.		 TO-220AC			 2 LEADED TO-247			 SINGLE LEAD TO-218			
	$I_{F(AVG)}$		$I_{F(AVG)}$			$I_{F(AVG)}$			$I_{F(AVG)}$			
V_{RRM}	4A	6A	8A	15A	30A	30A	50A	75A	50A	75A	100A	150A
400V	RHRD440 RHRD440S 2.1V 35ns	RHRD640 RHRD640S 2.1V 35ns	RHRP840 2.1V 35ns	RHRP1540 2.1V 40ns	RHRP3040 2.1V 45ns	RHRG3040 2.1V 45ns	RHRG5040 2.1V 50ns	RHRG7540 2.1V 60ns	RHRU5040 2.1V 50ns	RHRU7540 2.1V 60ns	RHRU10040 2.1V 60ns	RHRU15040 2.1V 70ns
500V	RHRD450 RHRD450S 2.1V 35ns	RHRD650 RHRD650S 2.1V 35ns	RHRP850 2.1V 35ns	RHRP1550 2.1V 40ns	RHRP3050 2.1V 45ns	RHRG3050 2.1V 45ns	RHRG5050 2.1V 50ns	RHRG7550 2.1V 60ns	RHRU5050 2.1V 50ns	RHRU7550 2.1V 60ns	RHRU10050 2.1V 60ns	RHRU15050 2.1V 70ns
600V	RHRD460 RHRD460S 2.1V 35ns	RHRD660 RHRD660S 2.1V 35ns	RHRP860 2.1V 35ns	RHRP1560 2.1V 40ns	RHRP3060 2.1V 45ns	RHRG3060 2.1V 45ns	RHRG5060 2.1V 50ns	RHRG7560 2.1V 60ns	RHRU5060 2.1V 50ns	RHRU7560 2.1V 60ns	RHRU10060 2.1V 60ns	RHRU15060 2.1V 70ns
700V			RHRP870 3.0V 65ns	RHRP1570 3.0V 70ns	RHRP3070 3.0V 75ns	RHRG3070 3.0V 75ns	RHRG5070 3.0V 95ns	RHRG7570 3.0V 100ns	RHRU5070 3.0V 95ns	RHRU7570 3.0V 100ns		
800V			RHRP880 3.0V 65ns	RHRP1580 3.0V 70ns	RHRP3080 3.0V 75ns	RHRG3080 3.0V 75ns	RHRG5080 3.0V 95ns	RHRG7580 3.0V 100ns	RHRU5080 3.0V 95ns	RHRU7580 3.0V 100ns		
900V			RHRP890 3.0V 65ns	RHRP1590 3.0V 70ns	RHRP3090 3.0V 75ns	RHRG3090 3.0V 75ns	RHRG5090 3.0V 95ns	RHRG7590 3.0V 100ns	RHRU5090 3.0V 95ns	RHRU7590 3.0V 100ns		RHRU15090 3.0V 100ns
1000V			RHRP8100 3.0V 65ns	RHRP15100 3.0V 70ns	RHRP30100 3.0V 75ns	RHRG30100 3.0V 75ns	RHRG50100 3.0V 95ns	RHRG75100 3.0V 100ns	RHRU50100 3.0V 95ns	RHRU75100 3.0V 100ns		RHRU150100 3.0V 100ns
1200V	RHRD4120 RHRD4120S 3.2V 70ns	RHRD6120 RHRD6120S 3.2V 65ns	RHRP8120 3.2V 70ns	RHRP15120 3.2V 75ns	RHRP30120 3.2V 75ns	RHRG30120 3.2V 75ns	RHRG50120 3.2V 100ns	RHRG75120 3.2V 100ns	RHRU50120 3.2V 100ns	RHRU75120 3.2V 100ns	RHRU100120 3.2V 100ns	RHRU150120 3.2V 125ns

NOTE: V_F at $I_{F(AVG)}$, $T_J = 25^oC$; t_{rr} at $I_{F(AVG)}$, dI_F/dt = 100A/µs or 200A/µs, $T_J = 25^oC$; † t_{rr} at I_F = 1A.

HARRIS DUAL HYPERFAST RECOVERY RECTIFIER PRODUCT LINE

	 TO-251AA  TO-252AA NOTE: The TO-252AA is designated by "S" suffix.	 TO-220AB			 TO-247	
	$I_{F(AVG)}$	$I_{F(AVG)}$			$I_{F(AVG)}$	
V_{RRM}	4Ax2	4Ax2	6Ax2	8Ax2	15Ax2	30Ax2
400V	RHRD440CC RHRD440CCS 2.1V 35ns		RHRP640CC 2.1V 35ns	RHRP840CC 2.1V 35ns	RHRG1540CC 2.1V 40ns	RHRG3040CC 2.1V 45ns
500V	RHRD450CC RHRD450CCS 2.1V 35ns		RHRP650CC 2.1V 35ns	RHRP850CC 2.1V 35ns	RHRG1550CC 2.1V 40ns	RHRG3050CC 2.1V 45ns
600V	RHRD460CC RHRD460CCS 2.1V 35ns		RHRP660CC 2.1V 35ns	RHRP860CC 2.1V 35ns	RHRG1560CC 2.1V 40ns	RHRG3060CC 2.1V 45ns
700V				RHRP870CC 3.0V 65ns	RHRG1570CC 3.0V 70ns	RHRG3070CC 3.0V 75ns
800V				RHRP880CC 3.0V 65ns	RHRG1580CC 3.0V 70ns	RHRG3080CC 3.0V 75ns
900V				RHRP890CC 3.0V 65ns	RHRG1590CC 3.0V 70ns	RHRG3090CC 3.0V 75ns
1000V				RHRP8100CC 3.0V 65ns	RHRG15100CC 3.0V 70ns	RHRG30100CC 3.0V 75ns
1200V		RHRP4120CC 3.2V 70ns	RHRP6120CC 3.2V 65ns	RHRP8120CC 3.2V 65ns	RHRG15120CC 3.2V 75ns	RHRG30120CC 3.2V 75ns

NOTE: *ITALICS* = Future Product Offerings; V_F at $I_{F(AVG)}$, $T_J = 25^oC$; t_{rr} at $I_{F(AVG)}$, $dI_F/dt = 100A/\mu s$ or $200A/\mu s$, $T_J = 25^oC$; † t_{rr} at $I_F = 1A$.

Check our world wide web site for the most current documentation.

TRANSIENT SUPPRESSORS 10

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TRANSIENT VOLTAGE SUPPRESSOR DEVICE SELECTION GUIDE

MARKET SEGMENT	TYPICAL APPLICATIONS AND CIRCUITS EXAMPLES	DEVICE FAMILY OR SERIES	DATA BOOK SECTION	TECHNOLOGY	SURFACE MOUNT AVAILABLE?
Low Voltage, Board Level Products	• Hand-Held/Portable Devices • EDP • Computer • I/O Port and Interfaces • Controllers • Instrumentation • Remote Sensors • Medical Electronics, etc.	CH	4	MOV	✔
		MA, ZA, RA	4	MOV	
		ML, MLE	5	Multilayer Suppressor	✔
		SP72X	6	SCR/Diode Array	✔(Note 1)
AC Line, TVSS Products	• UPS • AC Panels • AC Power Taps • TVSS Devices • AC Appliance/Controls • Power Meters • Power Supplies • Circuit Breakers • Consumer Electronics	UltraMOV™, "C" III, LA, HA, RA	4	MOV	
		CH	4	MOV	✔
		GDT	7	Gas Discharge Tube	
Automotive Electronics	• ABS • EEC • Instrument Cluster • Air Bag • Window Control • Wiper Modules • Multiplex Bus • EFI	CH	4	MOV	✔
		ZA	4	MOV	
		AUML, ML	5	Multilayer Suppressor	✔
		SP72X	6	SCR/Diode Array	✔(Note 1)
Telecommunications Products	• Cellular/Cordless Phone • Modems • Secondary Phone Line Protectors • Data Line Connectors • Repeaters • Line Cards	CH	4	MOV	✔
		CP, CS, ZA	4	MOV	
		ML, MLE	5	Multilayer Suppressor	✔
		SP72X	6	SCR/Diode Array	✔(Note 1)
		GDT	7	Gas Discharge Tube	
		Surgector	8	Thyristor/Zener	
Industrial, High Energy AC Products	• High Current Relays • Solenoids • Motor Drives • AC Distribution Panels • Robotics • Large Motors	DA/DB, BA/BB, CA, HA, NA, PA	4	MOV	
		GDT	7	Gas Discharge Tube	
Arrester Products	• Lightning Arrester Assemblies for High Voltage AC Power Distribution Lines and Utility Transformers	AS	9	MOV	

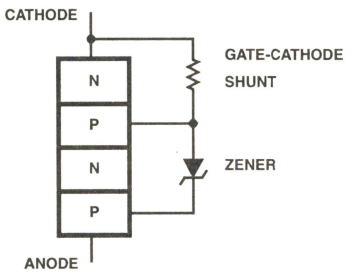
NOTE:

1. Available in both surface mount and through-hole packages.

SURGECTOR PRODUCTS

Features

- Shunts Voltage Transients Induced by Lightning and other High Voltages Away from Sensitive Electronic Circuitry
- SCR-type NPNP Semiconductor Device with Embedded Zener Across Anode-Gate Region
- Designed for Telecom or Datacom Protection
- UL Listed Under File #E135010 to UL STD 497B



SURGECTOR EQUIVALENT CIRCUIT MODEL

HI-REL MOVs (METAL OXIDE VARISTORS)

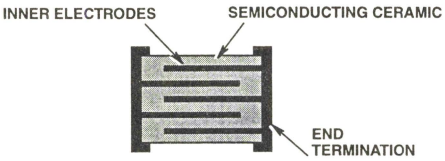
- For Hi-Rel and Military Qualified Products, See the Hi-Rel Sub Section

MLs–MULTI LAYER SUPPRESSORS

Document #AN9108

Features

- Multilayer Semiconductor Ceramic Dielectric-Based Device for Protecting Electronic Circuitry.
- Surface Mount, 0603-1210 EIA Sizes
- 3.5 to 68V Applications
- EDP, Telecom, Automotive and Industrial Applications
- Used for EMC Compliance
- Protects ICs and Transistors on the PC Board



ML MECHANICAL STRUCTURE

MOVs–METAL OXIDE VARISTORS 19 DIFFERENT SERIES!

Features

- Zinc Oxide-Based Device For Protecting Electronic Circuitry
- Every Electronic Circuit has a Need for Transient Voltage Protection, i.e., TVS (Transient Voltage Suppressor)
- Harris has a Device for Every Application
- Used in Virtually any Application; AC, DC, Telecom, Datacom, Power Supplies, Automotive, Motor Control, etc.
- Clamps High Voltage Transients and Absorbs Excess Energy Produced by Transients
- UL Approved Under File #E75961, E56529, and E135010
- CSA Approved Under File #LR91788
- Customized Parameters

SURGECTORs™, MULTILAYER Suppressors (AUML, ML, MLE), Metal Oxide Varistors (MOVs), SP Arrays and GDTs are designed to protect voltage-sensitive circuit components against damage from high-energy transient-voltage spikes. The protection afforded by these devices not only guards expensive and voltage-sensitive equipment from physical damage, but also improves functional reliability in components that can encounter temporary upset due to transient voltages of lower amplitudes.

AUTOMOTIVE AUML SERIES
MULTILAYER TRANSIENT SURGE SUPPRESSORS

Document #3387, AN9312

- Leadless Chip Form Surface Mount (1210, 1812 and 2220 Sizes)
- Variety of Energy Ratings Available
- 125°C Continuous Operating Temperature
- Load Dump Energy Handling Capability per SAE Specification J1113
- Inherently Bidirectional
- No Plastic or Epoxy Packaging Guarantees Better Than 94V-0 Flammability Rating

"C" III SERIES
RADIAL LEAD MOV FOR TVSS ENVIRONMENT

Document #3540

- Recognized as "Transient Voltage Surge Suppressors" to UL 1449; File # E75961
- Recognized as "Transient Voltage Surge Suppressors" to CSA C22.2, No. 1; File # LR91788
- High Energy Absorption Capability W_{TM}: 45J to 240J (2ms)
- High Peak Pulse Current Capability I_{TM}: 6000A to 9000A (8/20μs)
- Wide Operating Voltage Range $V_{M(AC)RMS}$: 130V to 300V
- Available in Tape and Reel for Automatic Insertion; Also Available Crimped and/or Trimmed
- AC Line Operation

AS SERIES
HIGH ENERGY MOV FOR ARRESTER APPLICATIONS

Document #2492

- Provided in Disc Form for Unique Packaging by Customer
- Electrode Finish Enables Pressure Contact for Stacking Application
- Available Disc Sizes: 32mm, 42mm and 60mm Diameter
- No Follow Current
- Large Surge Current Capability
- Designed for Lightning Protection of Distribution Transformers
- Component Part for AC Utility Arresters

CP/CS SERIES
CONNECTOR PIN MOV

Document #2972

- Unique Coaxial Design and Mounting Arrangement
- Wide Operating Voltage Range $V_{M(DC)}$ . . . . . 8V to 38V
- Self Contained Tubular Construction; Requires No Leads or Packages
- New Reduced Length CS Series; Less Than Half the Length of Standard CP Series

MLE SERIES
MULTILAYER SUPPRESSORS

Document #4263

- Designed for ESD Suppression
- Leadless Surface Mount 0603, 0805 and 1206 Sizes
- Rated for IEC 1000-4-2
- On-Board Protection for Circuits up to 18VDC
- Rated for Capacitance and Impedance
- Bi-Directional Clamping

VARISTOR PRODUCT FAMILY

PEAK CURRENT (A)	ENERGY (J)	MAXIMUM STEADY-STATE APPLIED VOLTAGE	DISC SIZES/ PACKAGES
		VOLTS AC RMS: 4, 10, 25, 130, 150, 250, 264, 275, 460, 660, 750, 1,000, 2,800, 6,000 / VOLTS DC: 3.5, 14, 35, 175, 200, 330, 365, 369, 615, 850, 970, 1,200, 3,500, 7,000	
80 - 500	0.5 - 5.0	CP, CS SERIES	22, 20, 16 GAUGE
30 - 1000	0.1 - 25	AUML, ML, MLE, CH SERIES	0603 0805 1206 1210 1812 2220 5 x 8mm
40 - 100	0.07 - 1.7	MA SERIES	3mm
25 - 4500	0.1 - 35	ZA SERIES	5, 7, 10, 14, 20 (mm)
100 - 6500	0.4 - 160	RA SERIES	5 x 8, 10 x 16, 14 x 22 (mm)
1,200 - 10,000	11 - 400	"C" III, LA, UltraMOV SERIES	7, 10, 14, 20 (mm)
6500	70 - 250	PA SERIES	20mm
25,000 - 40,000	270 - 1,050	HA, DA/ DB SERIES	32, 40 (mm)
50,000 - 70,000	450 - 10,000	BA/ BB SERIES	60mm
30,000 - 40,000	270 - 1050	NA SERIES	34mm SQ.
20,000 - 100,000	200 - 12,000	CA SERIES, AS SERIES	32, 40, 42, 52, 60 (mm)

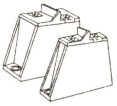
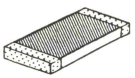
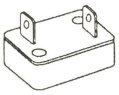
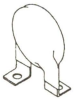
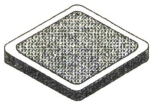
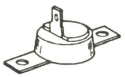
COMPARISON OF SURGE SUPPRESSION DEVICES

TRANSIENT SURGE SUPPRESION DEVICES	MAJOR ADVANTAGES/USES	MAJOR LIMITATIONS
Surgector	• Ideal for Datacom and Telecom • Leakage . . . . . <50nA • Shunt Capacitance. . . . . <50pF • Subnanosecond Response 8μs x 20μs • Lifetime Unlimited at 200A, 8μs x 20μs Pulse Shape • Failure Mode. . . . . .Short Circuit	• Cannot be Used in DC Circuits Where Available Current Exceeds Holding Current • Surge Current Capability 200A - 8μs x 20μs Pulse Shape • Limited AC Line Protection Capability
Metal-Oxide Varistor (MOV)	• Ideal for AC Power Lines; Suitable for Low-Voltage Logic Protection • Subnanosecond Response • Units Available up to . . . . . .70,000A Surge • Lifetime 1000A, 8μs x 20μs PulseShape 1000 Surges • Failure Mode - Short Circuit	• Shunt Capacitance . . . . . 500pF • Clamp Voltage Goes Up with Current
TVSS Zener	• Low-Voltage Logic Protection • Subnanosecond Response • Shunt Capacitance . . . . . .50pF • Failure Mode . . . . . .Short Circuit	• Clamp Voltage Goes Up with Current • Temperature Dependence • Low Energy
Gas Discharge Tube	• Wide Use in Telecom for Primary Protection • High Surge Capability . . . . . >20,000A • Leakage . . . . . .Subpicoamps • Shunt Capacitance . . . . . .<1pF • Lifetime 500A, 8μs x 20μs Pulse Width 200 Surges	• Response Time . . . . . .<5μs • Failure Mode - Open Circuit • Follow-On Current
MultiLayer (ML)	• Ideal for Automotive, CMOS, Portable, Industrial Control, Cell Phone, and Computer Applications • Leadless Surface Mount Chip • 150A, 8μs x 20μs Repetitive Surge Current Rated • Failure Mode-Short Circuit • Used of ESD and EMC • IEC 1000-4-2 Rated	• <120V Applications

Transient Voltage Suppression Ordering Nomenclature

TRANSIENT VOLTAGE SUPPRESSION DEVICES

MOV SERIES PACKAGES

AS	BA, BB 	CA	CH 	CP, CS
DA	DB 	HA 	LA, ZA	MA
	NA 	PA 	RA	

V (BA, BB, CA, CH, CP, CS, DA, DB, HA, LA, MA, NA, PA, RA, ZA) TYPES

BA, BB, CA, CP, CS, DA, DB, HA, LA, NA, PA, VARISTOR SERIES

V 130 LA 20 A

- A — Selection - Clamping Voltage (A or B)
- 20 — Relative Energy Indicator
- LA — Product Series
- 130 — Max RMS Applied Voltage
- V — V = Metal-Oxide Varistor (MOV)

CH, MA, RA, ZA, VARISTOR SERIES

V 220 MA 4 A

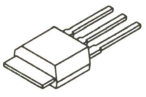
- A — Selection - Clamping Voltage (A or B)
- 4 — Relative Energy Indicator
- MA — Product Series
- 220 — V_N(DC) Nominal Varistor Voltage
- V — MOV Varistor

SGT SURGECTOR PACKAGES

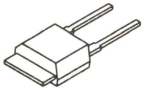
SGT 03 U 13

- 13 — Holding Current in mA divided by 10
- U — **Type of Surgector**
  - U: Unidirectional
  - B: Bidirectional
  - S: SCR
- 03 — Off-State Voltage Rating Divided by 10
- SGT — Surgector

Modified TO-202 Package Style



PACKAGE A



PACKAGE B

VXXAUMLA SUPPRESSION TYPES

V 18 XXX 1206 A23

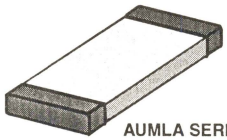
PACKING OPTION
A22: <100 pc Bulk Pak
H23: 2000 pc Reel or 2500 pc Reel (Note)
T23: 8000 pc Reel or 10,000 pc Reel (Note)

Device Size: i.e., 120 mil x 60 mil

Product Series
AUMLA

DC Working Voltage

ML MULTI-LAYER Suppressor

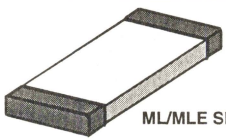


AUMLA SERIES

NOTE: Depending upon device size.

VXXML SUPPRESSION TYPES

V 18 ML X 1206 X X X



ML/MLE SERIES

DEVICE FAMILY
Harris TVSS Device

MAXIMUM DC WORKING VOLTAGE

MULTILAYER DESIGNATOR

PERFORMANCE DESIGNATOR
A: STD
E: ESD

DEVICE SIZE:
i.e., 120 mil x 60 mil

CAPACITANCE OPTION
No Letter: Standard
L: Low Capacitance Version

END TERMINATION OPTION
No Letter: Ag/Pt (Standard)
W: Ag/Pd
N: Ni/Sn

PACKING OPTIONS
A: <100 pc Bulk Pak
H: 7in (178mm) Diameter Reel (Note)
T: 13in (330mm) Diameter Reel (Note)

NOTE: Quantity per reel depending upon device size.

ULTRAMOV TYPES

V XX E XXX LX X X

DEVICE FAMILY:
Harris Varistor

DISC DIAMETER:
07, 10, 14, or 20 (mm)

ENCAPSULATION:
E = Epoxy

$V_{M(AC)RMS}$:
130 to 625 (V)

LEAD FORMATION:
L1 = Straight
L2 = Crimped
L3 = In-Line
L4 = Trim/Crimp
(Bulk pack only)

PACKAGING:
B = Bulk Pack
T = Tape and Reel
A = Ammo Pack

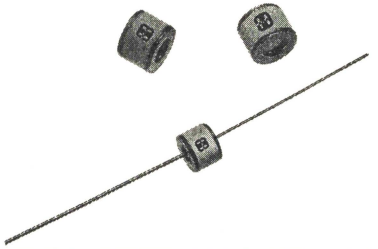
NON-STANDARD LEAD SPACING OPTIONS (DO NOT ADD IF STANDARD) (NOTE):
5 = 5mm Lead Spacing
7 = 7.5mm Lead Spacing
1 = 10mm Lead Spacing

NOTE: Standard lead space.

GAS DISCHARGE TUBE DEVICES

GAS DISCHARGE TUBE SERIES PACKAGING

HAC, HG, HG2, HG2-SN,



HPMT3

HG3

HAC GAS DISCHARGE TUBE TYPES

HAC 120 X X

DEVICE FAMILY
Harris HAC Series

AC LINE VOLTAGE
120: 120V
240: 240V

LEAD OPTIONS
L: Leads
Blank: No Leads

PACKAGING OPTIONS
T: Tape and Reel
Blank: Bulk

HG, HG2 GAS DISCHARGE TUBE TYPES

HG 90 X X
HG2-250 X X

DEVICE FAMILY
Harris HG, HG2 Series

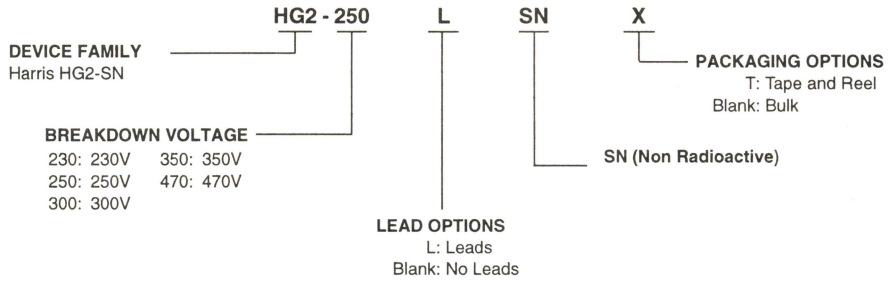
BREAKDOWN VOLTAGE

HG Types	250: 250V
75: 75V	300: 300V
90: 90V	350: 350V
110: 110V	470: 470V
HG2 Types	600: 600V
145: 145V	800: 800V
230: 230V	1000: 1000V

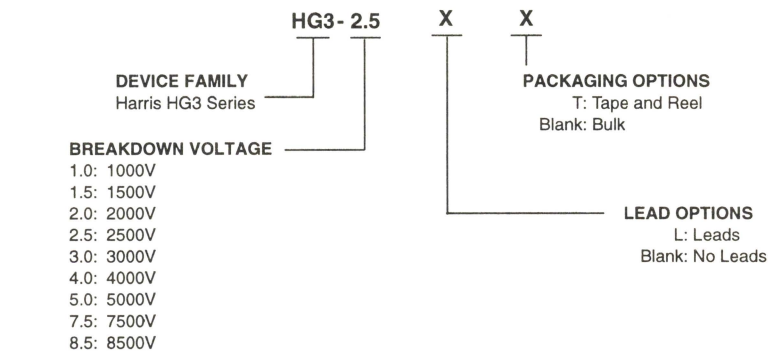
LEAD OPTIONS
L: Leads
Blank: No Leads

PACKAGING OPTIONS
T: Tape and Reel
Blank: Bulk

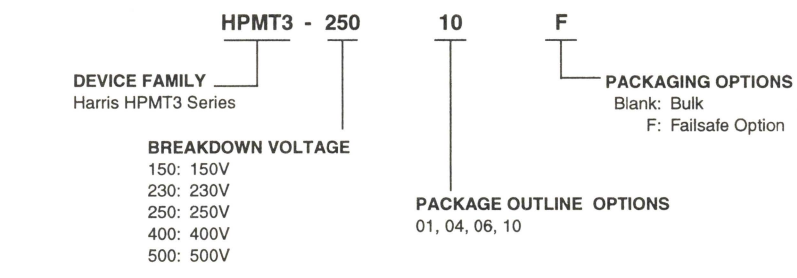
HG2-SN GAS DISCHARGE TUBE TYPES



HG3 GAS DISCHARGE TUBE TYPES



HPMT3 GAS DISCHARGE TUBE TYPES



Transient Voltage Suppression Product Selection Trees

VOLTAGE SUPPRESSION DEVICES

AS SERIES

V302AS32
V302AS42
V402AS32
V402AS42
V402AS60
V502AS32
V502AS42
V602AS32

BA/BB SERIES

V131BA60
V151BA60
V251BA60
V271BA60
V321BA60
V421BA60
V481BA60
V511BA60
V571BA60
V661BA60
V751BA60
V881BA60
V112BB60
V142BB60
V172BB60
V202BB60
V242BB60
V282BB60

CA SERIES

V131CA32
V131CA40
V151CA32
V151CA40
V251CA32
V251CA40
V251CA60
V271CA32
V271CA40
V271CA60
V321CA32
V321CA40
V321CA60
V421CA32
V421CA40
V421CA60
V481CA32
V481CA40
V481CA60
V511CA32
V511CA40
V511CA60
V571CA32
V571CA40
V571CA60
V661CA32
V661CA40
V661CA60
V751CA32
V751CA40
V751CA60
V881CA60
V112CA60
V142CA60
V172CA60
V202CA60
V242CA60
V282CA60

CH SERIES

V22CH8
V27CH8
V33CH8
V39CH8
V47CH8
V56CH8
V120CH8
V150CH8
V180CH8
V200CH8
V220CH8
V240CH8
V360CH8
V390CH8
V430CH8

CP SERIES

V8CP22
V14CP22
V31CP22
V38CP22
V130CP22
V150CP22
V31CP20
V38CP20
V130CP20
V150CP20
V38CP16
V130CP16
V150CP16

CS SERIES

V8CS22
V14CS22
V18CS22
V22CS22
V26CS22
V31CS22
V38CS22

DB SERIES

V131DB40
V151DB40
V251DB40
V271DB40
V321DB40
V421DB40
V481DB40
V511DB40
V571DB40
V661DB40
V751DB40

HA SERIES

V131HA32
V131HA40
V151HA32
V151HA40
V251HA32
V251HA40
V271HA32
V271HA40
V321HA32
V321HA40
V421HA32
V421HA40
V481HA32
V481HA40
V511HA32
V511HA40
V571HA32
V571HA40
V661HA32
V661HA40
V751HA32
V751HA40

DA SERIES

V131DA40
V151DA40
V251DA40
V271DA40
V321DA40
V421DA40
V481DA40
V511DA40
V571DA40
V661DA40
V751DA40

LA "C" III SERIES

V130LA10C
V130LA20C
V130LA20CX325
V140LA10C
V140LA20C
V140LA20CX340
V150LA10C
V150LA20C
V150LA20CX360
V175LA10C
V175LA20C
V175LA20CX425
V230LA20C
V230LA40C
V230LA40CX570
V250LA20C
V250LA40C
V250LA40CX620
V275LA20C
V275LA40C
V275LA40CX680
V300LA20C
V300LA40C
V300LA40CX745
V320LA20C
V320LA40C

NA SERIES

V131NA34
V151NA34
V251NA34
V271NA34
V321NA34
V421NA34
V481NA34
V511NA34
V571NA34
V661NA34
V751NA34

LA SERIES

V130LA1
V130LA2
V130LA5
V130LA10A
V130LA20A
V130LA20B
V140LA2
V140LA5
V140LA10A
V140LA20A
V150LA1
V150LA2
V150LA5
V150LA10A
V150LA20A
V150LA20B
V175LA2
V175LA5
V175LA10A
V175LA20A
V230LA4
V230LA10
V230LA20A
V230LA40A
V250LA2
V250LA4
V250LA10
V250LA20A
V250LA40A
V250LA40B
V275LA2
V275LA4
V275LA10
V275LA20A
V275LA40A
V275LA40B
V300LA2
V300LA4
V300LA10
V300LA20A
V300LA40A
V320LA7
V320LA10
V320LA20A
V320LA40B
V385LA7
V385LA10
V385LA20A
V385LA40B
V420LA77
V420LA10
V420LA20A
V420LA40B
V460LA7
V480LA7
V480LA10
V480LA40A
V480LA80B
V510LA10
V510LA40A
V510LA80B
V575LA10
V575LA40A
V575LA80B
V625LA10
V625LA40A
V625LA80B
V660LA10
V660LA50A
V660LA100B
V1000LA80A
V1000LA160B

ULTRAMOV SERIES

V07E130
V10E130
V14E130
V20E130
V07E140
V10E140
V14E140
V20E140
V07E150
V10E150
V14E150
V20E150
V07E175
V10E175
V14E175
V20E175
V07E230
V10E230
V14E230
V20E230
V07E250
V10E250
V14E250
V20E250
V07E275
V10E275
V14E275
V20E275
V07E300
V10E300
V14E300
V20E300
V07E320
V10E320
V14E320
V20E320
V07E385
V10E385
V14E385
V20E385
V07E420
V10E420
V14E420
V20E420
V07E440
V10E440
V14E440
V20E440
V07E460
V10E460
V14E460
V20E460
V10E510
V14E510
V20E510
V10E550
V14E550
V20E550
V10E625
V14E625
V20E625

VOLTAGE SUPPRESSION DEVICES (Continued)

MA SERIES

V18MA1A	V39MA2A	V82MA3A	V180MA3B
V18MA1B	V39MA2B	V82MA3B	V220MA2A
V18MA1S	V39MA2S	V82MA3S	V220MA4B
V22MA1A	V47MA2A	V100MA4A	V270MA2A
V22MA1B	V47MA2B	V100MA4B	V270MA4B
V22MA1S	V47MA2S	V100MA4S	V330MA2A
V27MA1A	V56MA2A	V120MA1A	V330MA5B
V27MA1B	V56MA2B	V120MA2B	V390MA3A
V27MA1S	V56MA2S	V120MA2S	V390MA6B
V33MA1A	V68MA3A	V150MA1A	V430MA3A
V33MA1B	V68MA3B	V150MA2B	V430MA7B
V33MA1S	V68MA3S	V180MA1A	

PA SERIES

V130PA20A	V420PA40A
V130PA20C	V420PA40C
V150PA20A	V480PA80A
V150PA20C	V480PA80C
V250PA40A	V510PA80A
V250PA40C	V510PA80C
V275PA40A	V575PA80A
V275PA40C	V575PA80C
V320PA40A	V660PA100A
V320PA40C	V660PA100C

RA SERIES

V8RA8	V100RA8
V12RA8	V120RA8
V18RA8	V150RA8
V22RA8	V180RA8
V27RA8	V200RA8
V33RA8	V220RA8
V39RA8	V240RA8
V47RA8	V270RA8
V56RA8	V360RA8
V68RA8	V390RA8
V82RA8	V430RA8

ZA SERIES

V8ZA05	V22ZA05	V33ZA1	V47ZA1	V68ZA3	V120ZA05	V180ZA1	V430ZA05
V8ZA1	V22ZA1	V33ZA2	V47ZA3	V68ZA10	V120ZA1	V180ZA5	V470ZA05
V8ZA2	V22ZA2	V33ZA5	V47ZA7	V68ZA20	V120ZA4	V180ZA10	V620ZA05
V12ZA05	V22ZA3	V33ZA70	V47ZA20	V82ZA05	V120ZA6	V180ZA20	V680ZA05
V12ZA1	V24ZA50	V36ZA80	V56ZA05	V82ZA2	V120ZA20	V205ZA05	V715ZA05
V12ZA2	V27ZA05	V39ZA05	V56ZA2	V82ZA4	V150ZA05	V220ZA05	V750ZA05
V18ZA05	V27ZA1	V39ZA1	V56ZA3	V82ZA12	V150ZA1	V240ZA05	
V18ZA1	V27ZA2	V39ZA3	V56ZA8	V100ZA05	V150ZA4	V270ZA05	
V18ZA2	V27ZA4	V39ZA6	V56ZA20	V100ZA3	V150ZA8	V330ZA05	
V18ZA3	V27ZA60	V39ZA20	V68ZA05	V100ZA4	V150ZA20	V360ZA05	
V18ZA40	V33ZA05	V47ZA05	V68ZA2	V100ZA15	V180ZA05	V390ZA05	

SURGECTORS

SGT10S10	SGT22B13A
SGT27S10	SGT23B13
SGT27S23	SGT23B13A
SGT03U13	SGT27B13
SGT06U13	SGT27B13A
SGT23U13	SGT27B13B
SGT21B13	SGT27B27
SGT21B13A	SGT27B27A
SGT22B13	SGT27B27B

MULTILAYERS

ML SERIES

V3.5MLA0603	V14MLA1206
V3.5MLA0805	V18MLA0603
V3.5MLA0805L	V18MLA0805
V3.5MLA1206	V18MLA0805L
V5.5MLA0603	V18MLA1206
V5.5MLA0805	V18MLA1210
V5.5MLA0805L	V26MLA1206
V5.5MLA1206	V26MLA1210
V9MLA0603	V33MLA1206
V14MLA0603	V42MLA1206
V14MLAA0805	V56MLA1206
V14MLA0805L	V68MLA1206

SP SERIES

SP710	SP720MD	SP721
SP720	SP720MM-8	SP723
SP720MD-8	SP720MM	

MLE SERIES

V18MLE0603
V18MLE0805
V18MLE1206

AUML SERIES

V18AUMLA1210
V18AUMLA1812
V18AUMLA2220

GAS DISCHARGE TUBES

HAC SERIES

HAC120
HAC120L
HAC240
HAC240L

HG SERIES

HG75
HG75L
HG90
HG90L
HG90SN
HG90LSN
HG110
HG110L
HG2-145
HG2-145L
HG2-230
HG2-230L
HG2-250
HG2-250L
HG2-300
HG2-300L
HG2-350
HG2-350L
HG2-470
HG2-470L
HG2-600
HG2-600L
HG2-800
HG2-800L
HG2-1000
HG2-1000L
HG2-230SN
HG2-230LSN
HG2-250SN
HG2-250LSN
HG2-300SN
HG2-300LSN
HG2-350SN
HG2-350LSN
HG2-470SN
HG2-470LSN
HG3-1.0
HG3-1.0L
HG3-1.5
HG3-1.5L
HG3-2.0
HG3-2.0L
HG3-2.5
HG3-2.5L
HG3-3.0
HG3-3.0L
HG3-4.0
HG3-4.0L
HG3-5.0
HG3-5.0L
HG3-7.5
HG3-7.5L
HG3-8.5
HG3-8.5L

HPMT3 SERIES

HPMT3-15001
HPMT3-15004
HPMT3-15006
HPMT3-15010
HPMT3-23001
HPMT3-23004
HPMT3-23006
HPMT3-23010
HPMT3-25001
HPMT3-25004
HPMT3-25006
HPMT3-25010
HPMT3-35001
HPMT3-35004
HPMT3-35006
HPMT3-35010
HPMT3-40001
HPMT3-40004
HPMT3-40006
HPMT3-40010
HPMT3-50001
HPMT3-50004
HPMT3-50006
HPMT3-50010

SURGECTOR PRODUCTS

Features

- High Input Impedance Until Breakdown (i.e., Low Leakage)
- Repeatable Breakdown/Threshold Voltage
- High Surge Current Handling Capability
- Withstand And Respond To Rapidly Recurring Surges
- Fast Recovery To High Impedance State (Turn Off)
- Dual Polarity Protection
- Zener (Avalanche) Diode and SCR-Type Thyristor
- Zener Provides Continuous Low Voltage Protection
- Thyristor Provides Instantaneous Protection Against Fast Rising Transients

SURGECTORs Provide Transient Protection for:

- Central Office Equipment
- Repeaters
- Supervisory Equipment
- Line Concentrator
- Switchgear Equipment
- Receivers
- Data Transmission
- Headsets
- Handsets
- Modem
- EPABX, PABX, PBX
- PCM

Glossary

Var. Clamp - Provides external pin to turn surgector on or off.

Unidirectional - Handles positive OR negative going transient waveforms.

Bidirectional - Handles positive AND negative going transient waveforms.

Clamping Voltage (V_Z) - Off state voltage at a specified current.

Breakdown Voltage (V_{BO}) - Voltage at which the surgector switches from the off state to the on state.

Holding Current (I_H) - Minimum on state current that will hold the surgector in the on state after it has been latched on.

Max Peak Surge Current (I_{TSM}) - Maximum non-repetitive current which may be allowed to flow for the time state.

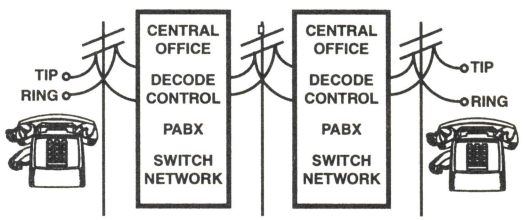


FIGURE 1.

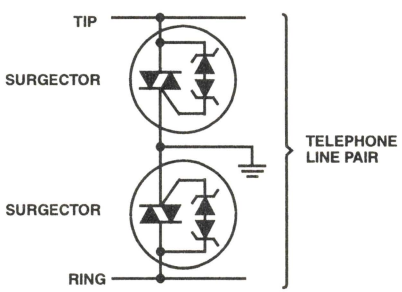


FIGURE 2. TYPICAL APPLICATIONS CIRCUIT

Two bidirectional SURGECTOR devices are placed between the tip and ring lines just after these lines enter the telephone to protect delicate telecommunications equipment.

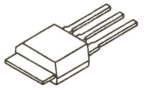
Nomenclature, Packages, and Shipping

The Surgector type numbers are easy to interpret. The first three characters - the letter "SGT" - stand for SURGECTOR. Next comes two digits, which represent the maximum off-state voltage divided by 10. Following the voltage is a letter indicating either SCR (S), Unidirectional (U), or Bidirectional (B). The next two digits indicate holding current in milliamps divided by 10.

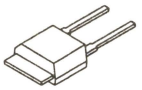
All versions of the Surgector are housed in a modified TO-202 versatab plastic package. This is a single-in-line package, meaning that all leads come out of the same end and are parallel to one another. The advantage of single-in-line packaging is that it makes the Surgector easy to insert into a circuit board or socket by automated methods.

Surgector Packages

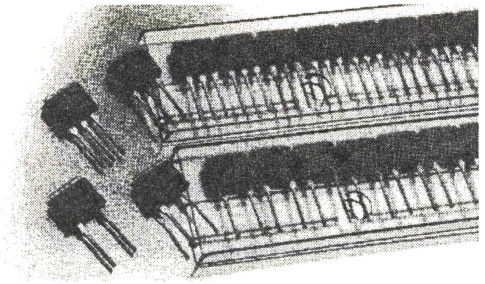
MODIFIED TO-202 PACKAGE STYLE



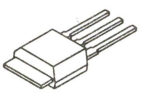
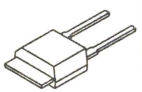
PACKAGE A



PACKAGE B

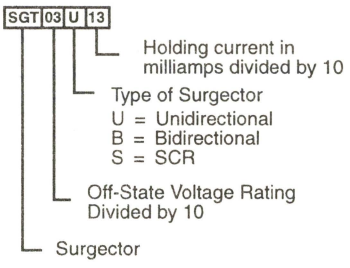


SURGECTOR devices are shipped to the customer either in bulk or on plastic "sticks" designed for automated machinery handling. The sticks are rectangular tubes that hold 50 SURGECTOR devices each.

PART NUMBER	FUNCTION	V_Z MIN (V)	V_{BO} MAX (100V/μs)	I_{TSM} (1 x 2μs)	I_{TSM} (10 x 1000μs)	I_H (mA)	PACKAGE STYLE
SGT10S10 (Note 1)	VAR Clamp	100	Note 1	300	100	>100	
SGT27S10 (Note 1)	VAR Clamp	270	Note 1	300	100	>100	
SGT27S23 (Note 1)	VAR Clamp	270	Note 1	300	100	>230	
SGT03U13	Unidirectional	30	< 50	300	100	>130	
SGT06U13	Unidirectional	60	< 85	300	100	>130	
SGT23U13	Unidirectional	230	< 275	300	100	>130	
SGT21B13	Bidirectional	210	270	300	100	>130	
SGT21B13A	Bidirectional	210	290	300	100	>130	
SGT22B13	Bidirectional	220	280	300	100	>130	
SGT22B13A	Bidirectional	220	290	300	100	>130	
SGT23B13	Bidirectional	230	290	300	100	>130	
SGT23B13A	Bidirectional	230	315	300	100	>130	
SGT27B13	Bidirectional	270	345	300	100	>130	
SGT27B13A	Bidirectional	270	360	300	100	>130	
SGT27B13B	Bidirectional	270	375	300	100	>130	
SGT27B27	Bidirectional	270	345	600	200	>270	
SGT27B27A	Bidirectional	270	360	600	200	>270	
SGT27B27B	Bidirectional	270	375	600	200	>270	

NOTES:

1. Dependent on trigger circuit.
2. All surgectors supplied in modified JEDEC TO-202 Package.
   Package Style A = 3 lead version
   Package Style B = 2 lead version
3. All devices UL recognized to 497B - File Number E135010.



MultiLayer Suppressor Selection Guide

MULTI-LAYER SUPPRESSORS (MLs)

Features

- MLs Clamp Board Level Surge Voltages
- Designed for Surface Mount Applications
- More Energy Handling Capability than Zeners
- Used for EMC
- Leadless Chip Form - Surface Mount - "Zero" Lead Inductance
- Available in Tape and Reel
- -40°C to 125°C Operating Temperature Range
- Low Profile, Compact Chip Size
- Fast Response to Transients
- Suitable for Reflow and Wave solder Operations

ML SERIES DEVICE RATINGS AND CHARACTERISTICS

MODEL NUMBER	MAXIMUM RATINGS (125°C)					CHARACTERISTICS (25°C)		
	MAXIMUM CONTINUOUS WORKING VOLTAGE		MAXIMUM NON-REPETITIVE SURGE CURRENT (8/20μs)	MAXIMUM NON-REPETITIVE SURGE ENERGY (10/1000μs)	MAXIMUM CLAMPING VOLTAGE AT 10AMP (8/20μs)	NOMINAL VOLTAGE AT 1mA DC TEST CURRENT		TYPICAL CAPACITANCE
	$V_{M(DC)}$	$V_{M(AC)}$	I_{TM}	W_{TM}	V_C	$V_{N(DC)}$ MIN	$V_{N(DC)}$ MAX	f = 1MHz
	(V)	(V)	(A)	(J)	(V)	(V)	(V)	(pF)
V3.5MLA0603	3.5	2.5	30	0.1	10 at 2A	3.7	7.0	1100
V3.5MLA0805	3.5	2.5	120	0.3	10 at 5A	3.7	7.0	2200
V3.5MLA0805L	3.5	2.5	40	0.1	10 at 2A	3.7	7.0	1200
V3.5MLA1206	3.5	2.5	100	0.3	14	3.7	7.0	7000
V5.5MLA0603	5.5	4.0	30	0.1	15.5 at 2A	7.1	9.3	660
V5.5MLA0805	5.5	4.0	120	0.3	15.5 at 5A	7.1	9.3	1600
V5.5MLA0805L	5.5	4.0	40	0.1	15.5 at 2A	7.1	9.3	860
V5.5MLA1206	5.5	4.0	100	0.4	15.5	7.1	9.3	7200
V9MLA0603	9.0	6.5	30	0.1	23 at 2A	11.0	16.0	420
V14MLA0603	14	10	30	0.4	30 at 2A	15.9	20.3	150
V14MLA0805	14	10	120	0.1	30 at 5A	15.9	20.3	480
V14MLA0805L	14	10	40	0.3	30 at 2A	15.9	20.3	270
V14MLA1206	14	10	100	0.4	30	15.9	20.3	2100
V18MLA0603	18	14	30	0.1	40 at 2A	22	28.0	125
V18MLA0805	18	14	120	0.3	40 at 5A	22	28.0	450
V18MLA0805L	18	14	40	0.1	40 at 2A	22	28.0	250
V18MLA1206	18	14	150	0.4	40	22	28.0	1100
V18MLA1210	18	14	250	0.8	40	22	28.0	1250
V26MLA1206	26	20	150	0.6	56	29.5	38.5	900
V26MLA1210	26	20	250	1.2	54	29.5	38.5	1000
V33MLA1206	33	26	180	0.8	72	38	49	550
V42MLA1206	42	30	180	0.8	86	46	60	550
V56MLA1206	56	40	180	1.0	110	61	77	150
V68MLA1206	68	50	180	1.0	130	76	90	150

NOTES:

1. L suffix is a low capacitance and energy version. Contact Sales for custom capacitance requirements
2. Typical leakage at 25°C < 50μA, maximum leakage 100μA at $V_{M(DC)}$.
3. Average power dissipation of transients for 0603, 0805, 1206 and 1210 sizes not to exceed 0.05, 0.10W, 0.10W and 0.15W, respectively.
4. Devices specifically characterized for automotive applications also available. (See AUML Series).
5. Devices specifically characterized for ESD suppression also available. (See MLE Series).

AUML SERIES (AUTOMOTIVE) DEVICE RATINGS AND CHARACTERISTICS

MODEL NUMBER	MAXIMUM RATINGS (125°C)			CHARACTERISTICS (25°C)				
	MAXIMUM CONTINUOUS DC VOLTAGE	JUMP START VOLTAGE (5 MIN)	LOAD DUMP ENERGY (10 PULSES)	NOMINAL VARISTOR VOLTAGE AT 10mA DC TEST CURRENT		MAXIMUM STANDBY LEAKAGE (AT 13V DC)	MAXIMUM CLAMPING VOLTAGE (V_C) AT TEST CURRENT (8/20µs)	
	$V_{M(DC)}$	V_{JUMP}	W_{LD}	$V_{N(DC)}$ MIN	$V_{N(DC)}$ MAX	I_L	V_C	I_P
	(V)	(V)	(J)	(V)	(V)	(µA)	(V)	(A)
V18AUMLA1210	16	24.5	3	23	32	50	40	1.5
V18AUMLA1812	16	24.5	6	23	32	100	40	5
V18AUMLA2220	16	24.5	25	23	32	200	40	40

NOTES:

1. Average power dissipation of transients not to exceed 0.15W, 0.3W and 1W for model sizes 1210, 1812 and 2220 respectively.
2. Load dump energy rating (into the suppressor) of a voltage transient with a time constant of 115ms to 230ms.
3. Thermal shock capability per MIL-STD-750, Method 1051: -55°C to 125°C, 5 minutes at 25°C, 25 Cycles: 15 minutes at each extreme.
4. For application specific requirements, please contact Harris sales office.

MLE DEVICE RATINGS AND CHARACTERISTICS

MODEL NUMBER	MAXIMUM CONTINUOUS WORKING VOLTAGE -55°C to 125°C	PERFORMANCE CHARACTERISTICS (25°C)						
		NOMINAL VOLTAGE		(NOTE 2) TYPICAL ESD CLAMP VOLTAGE		(NOTE 5) TYPICAL CAPACITANCE AT 1MHz	MAXIMUM LEAKAGE	
	(NOTE 1) $VM_{(DC)}$	V_{NOM} AT 1mADC		(NOTE 3) 8kV CONTACT PEAK (V)	(NOTE 4) 15kV AIR PEAK (V)		I_L MAX	AT APPLIED VOLTAGE
	(v)	MIN (V)	MAX (V)			(pF)	(µA)	V_{DC}
V18MLE0603	18	22	28	<140	<85	<100	0.1	3.5
							0.3	5.5
							5.0	15
							25	18
V18MLE0805	18	22	28	<95	<75	<500	0.2	3.5
							0.5	5.5
							5.0	15
							25	18
V18MLE1206	18	22	28	<75	<65	<1700	0.5	3.5
							1.0	5.5
							5.0	15
							25	18

NOTES:

1. For applications of 18VDC or less. Higher voltages available, contact Sales.
2. Tested for IEC-1000-4-2 Human Body Model (HBM) discharge test circuit.
3. Direct discharge to device terminals (IEC preferred test method).
4. Corona discharge through air (represents actual ESD event).
5. Capacitance may be customized, contact Sales.

MOV Transient Voltage Suppressor Selection Guide

SPECIAL PRODUCTS FOR SPECIAL APPLICATIONS

Features

- Wide Voltage/Energy Range
- Excellent Clamp Ratio
- Fast Response Time
- Low Standby Power
- ISO 9000 Approved
- IEC Conformance
- No Follow-On Current
- DESC (QPL) Parts
- UL Recognized
- Rad Hard
- CSA Recognized
- CECC Approved

CH SERIES SURFACE-MOUNT VARISTORS

- UL/CSA Recognized
- Higher Reliability
- Save on Board Real Estate
- Increases Circuit Density

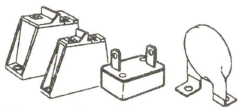
ZA SERIES

- Radial Package
- Low Voltage Operation
- UL/CSA Recognized
- CECC Approved

"C"III/LA/UltraMOV SERIES

- Radial Package
- Line Voltage Operation
- UL/CSA Recognized
- CECC Approved

BB, BA, DA, DB, HA SERIES

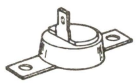


- High Energy Capability
- Rigid Terminals
- Isolated
- Low Inductance
- Improved Creep and Strike
- UL/CSA Recognized

CS/CP SERIES CONNECTOR PIN VARISTORS

- Provides Protection in Connectors
- 22, 20 and 16 Pin Gauge Size
- Rad Hard
- Compact Size
- Solderable

PA SERIES

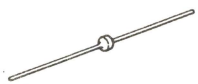


- Rigid Mountdown
- NEMA Creep and Strike Distance
- Quick Connect Terminal
- UL/CSA Recognized

AS SERIES

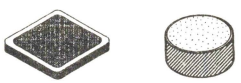
- Arrester Discs

MA SERIES



- Axial Package
- Wide Voltage
- Automatic Insertion

NA, CA SERIES



- Industrial Discs
- Solderable Contacts
- Edge Passivation

AUML/ML/MLE SERIES

- Surface Mount Leadless Chip
- 0603-2220 Sizes
- 3.5V - 68VDC Applications
- Used for EMC/ESD Compliance
- Multilayer Technology
- Nickel Barrier End Term Option

HIGH-RELIABILITY SERIES

- 100% Prescreened
- 100% Process Conditioning
- Meets Military Specifications
- DESC (QPL) Parts
- Rad Hard
- CECC

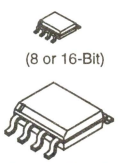
RA SERIES

- Low Profile
- High Temperature Capability
- In-Line Leads
- Precise Seating Plane
- UL/CSA Recognized

GAS DISCHARGE TUBES (GDTs)

- Small Size
- Rugged Ceramic Metal Construction
- Available With or Without Leads
- Available in Tape & Reel Packaging

SP

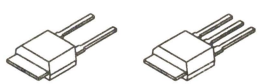


(8 or 16-Bit)

(Enlarged for Viewing)

- Perfect for ESD Protection of Data Lines
- Fast Switching < 6ns
- Very Low Capacitance of 3pf typical
- Up to 14 Line Protection in One Package

SURGECTORS



- Sub Nano-Second Clamping Response
- Ideal for DataCom and TeleCom
- In-Line Leads
- UL Recognized

CH, CP, CS, MA SERIES NOMINAL VOLTAGE SELECTION

VOLTAGE			CH SERIES	CP SERIES			CS SERIES	MA SERIES
$V_{m(AC)}$	$V_{m(DC)}$	$V_{n(DC)}$	5 x 8mm	16 GAUGE	20 GAUGE	22 GAUGE	22 GAUGE	3mm
6	8	16				V8CP22	V8CS22	
9	13	18						V18MA1A
10	14	18						V18MA1B, S
10	15	22						V22MA1A
14	18	22	V22CH8			V14CP22	V14CS22	V22MA1B, S
14	18	24					V18CS22	
13	19	27						V27MA1A
17	22	27	V27CH8				V22CS22	V27MA1B, S
18	23	33						V33MA1A
20	26	33	V33CH8				V26CS22	V33MA1B, S
22	28	39						V39MA2A
25	31	39	V39CH8		V31CP20	V31CP22	V31CS22	V39MA2B, S
27	34	47						V47MA2A
30	38	47	V47CH8	V38CP16	V38CP20	V38CP22	V38CS22	V47MA2B, S
32	40	56						V56MA2A
35	45	56	V56CH8					V56MA2B, S
38	48	68						V68MA3A
40	56	68						V68MA3B, S
45	60	82						V82MA3A
50	66	82						V82MA3B, S
57	72	100						V100MA4A
60	81	100	V100CH8					V100MA4B, S
72	97	120						V120MA1A
75	101	120						V120MA2B, S
75	102	120	V120CH8					
88	121	150						V150MA1A
92	127	150						V150MA2B
95	127	150	V150CH8					
105	144	180						V180MA1A
110	152	180						V180MA3B

CH, CP, CS, MA SERIES NOMINAL VOLTAGE SELECTION (Continued)

VOLTAGE			CH SERIES	CP SERIES			CS SERIES	MA SERIES
$V_{m(AC)}$	$V_{m(DC)}$	$V_{n(DC)}$	5 x 8mm	16 GAUGE	20 GAUGE	22 GAUGE	22 GAUGE	3mm
115	153	180	V180CH8					
130	130	200		V130CP16	V130CP20	V130CP22		
130	175	200	V200CH8					
132	181	220						V220MA2A
138	191	220						V220MA4B
140	180	220	V220CH8					
150	150	240		V150CP16	V150CP20	V150CP22		
150	200	240	V240CH8					
163	224	270						V270MA2A
171	235	270						V270MA4B
188	257	330						V330MA2A
200	274	330						V330MA5B
230	300	360	V360CH8					
234	322	390						V390MA3A
242	334	390						V390MA6B
250	330	390	V390CH8					
253	349	430						V430MA3A
264	365	430						V430MA7B
275	369	430	V430CH8					

PA, NA, HA, DA, DB, CA, BA/BB SERIES NOMINAL VOLTAGE SELECTION

VOLTAGE			PA SERIES	NA SERIES	HA SERIES		DA SERIES	DB SERIES	CA SERIES			BA/BB SERIES
$V_{m(AC)}$	$V_{m(DC)}$	$V_{n(DC)}$	20mm	34x34mm	32mm	40mm	40mm	40mm	32mm	40mm	60mm	60mm
130	175	200	V130PA20A,C	V131NA34	V131HA32	V131HA40	V131DA40	V131DB40	V131CA32	V131CA40		V131BA60
150	200	240	V150PA20A,C	V151NA34	V151HA32	V151HA40	V151DA40	V151DB40	V151CA32	V151CA40		V151BA60
250	330	390	V250PA40A,C	V251NA34	V251HA32	V251HA40	V251DA40	V251DB40	V251CA32	V251CA40	V251CA60	V251BA60
275	369	430	V275PA40A,C	V271NA34	V271HA32	V271HA40	V271DA40	V271DB40	V271CA32	V271CA40	V271CA60	V271BA60
320	420	510	V320PA40A,C	V321NA34	V321HA32	V321HA40	V321DA40	V321DB40	V321CA32	V321CA40	V321CA60	V321BA60
420	560	680	V420PA40A,C	V421NA34	V421HA32	V421HA40	V421DA40	V421DB40	V421CA32	V421CA40	V421CA60	V421BA60
480	640	750	V480PA80A,C	V481NA34	V481HA32	V481HA40	V481DA40	V481DB40	V481CA32	V481CA40	V481CA60	V481BA60
510	675	820	V510PA80A,C	V511NA34	V511HA32	V511HA40	V511DA40	V511DB40	V511CA32	V511CA40	V511CA60	V511BA60
575	730	910	V575PA80A,C	V571NA34	V571HA32	V571HA40	V571DA40	V571DB40	V571CA32	V571CA40	V571CA60	V571BA60
660	850	1050	V660PA100A,C	V661NA34	V661HA32	V661HA40	V661DA40	V661DB40	V661CA32	V661CA40	V661CA60	V661BA60
750	970	1200		V751NA34	V751HA32	V751HA40	V751DA40	V751DB40	V751CA32	V751CA40	V751CA60	V751BA60
880	1150	1500									V881CA60	V881BA60
1100	1400	1800									V112CA60	V112BB60
1400	1750	2200									V142CA60	V142BB60
1700	2150	2700									V172CA60	V172BB60
2000	2500	3300									V202CA60	V202BB60
2400	3000	3900									V242CA60	V242BB60
2800	3500	4700									V282CA60	V282BB60

LA, ZA, AND RA SERIES NOMINAL VOLTAGE SELECTION

VOLTAGE			LA, ZA SERIES					RA SERIES		
$V_{m(AC)}$	$V_{m(DC)}$	$V_{n(DC)}$	5mm	7mm	10mm	14mm	20mm	5 x 8mm	10 x 16mm	14 x 22mm
4	5.5	6 - 11	V8ZA05	V8ZA1	V8ZA2			V8RA8		
6	8	9 - 16	V12ZA05	V12ZA1	V12ZA2			V12RA8		
10	14	14.4 - 21.6	V18ZA05	V18ZA1	V18ZA2	V18ZA3	V18ZA40	V18RA8	V18RA16	
14	18	18.7 - 26	V22ZA05	V22ZA1	V22ZA2	V22ZA3		V22RA8	V22RA16	
14	18	19.2 - 26					V24ZA50			V24RA22
17	22	23 - 31.1	V27ZA05	V27ZA1	V27ZA2	V27ZA4	V27ZA60	V27RA8	V27RA16	
20	26	29.5 - 38	V33ZA05							
20	26	29.5 - 36.5		V33ZA1	V33ZA2	V33ZA5		V33RA8	V33RA16	
21	27	29.5 - 36.5					V33ZA70			
23	31	32 - 40					V36ZA80			V36RA22
25	31	35 - 46	V39ZA05							
25	31	35 - 43		V39ZA1	V39ZA3	V39ZA6	V39ZA20	V39RA8	V39RA16	
30	38	42 - 55	V47ZA05							
30	38	42 - 52		V47ZA1	V47ZA3	V46Z17	V47ZA20	V47RA8	V47RA16	
35	45	50 - 66	V56ZA05							
35	45	50 - 62		V56ZA2	V56ZA3	V56ZA8	V56ZA20	V56RA8	V56RA16	
40	56	61 - 80	V68ZA05							
40	56	61 - 75		V68ZA2	V68ZA3	V68ZA10	V68ZA20	V68RA8	V68RA16	
50	66	73 - 97	V82ZA05							
50	66	73 - 91		V82ZA2	V82ZA4	V82ZA12		V82RA8	V82RA16	
60	81	90 - 117	V100A05							
60	81	90 - 110		V100ZA3	V100ZA4	V100ZA15		V100RA8	V100RA16	
75	102	108 - 138	V120ZA05							
75	102	108 - 132		V120ZA1	V120ZA4	V120ZA6	V120ZA20	V120RA8	V120RA16	
90	127	135 - 173	V150ZA05							
92	127	135 - 165		V150ZA1	V150ZA4	V150ZA8	V150ZA20	V150RA8	V150RA16	
110	153	162 - 207	V180ZA05							
115	153	162 - 198		V180ZA1	V180ZA5	V180ZA10	V180ZA20	V180RA8	V180RA16	
130	170	184 - 226	V205ZA05							
130	175	184 - 255	V130LA1							
130	175	184 - 228		V130LA2	V130LA5	V130LA10A	V130LA20A	V200RA8	V200RA16	V200RA22

LA, ZA, AND RA SERIES NOMINAL VOLTAGE SELECTION (Continued)

VOLTAGE			LA, ZA SERIES					RA SERIES		
$V_{m(AC)}$	$V_{m(DC)}$	$V_{n(DC)}$	5mm	7mm	10mm	14mm	20mm	5 x 8mm	10 x 16mm	14 x 22mm
130	175	184 - 220					V130LA20B			
140	180	198 - 253	V220ZA05							
140	180	198 - 242		V140LA2	V140LA5	V140LA10A		V220RA8	V220RA16	
140	180	198 - 228					V140LA20A			
150	200	216 - 264	V240ZA05							
150	200	212 - 284	V150LA1							
150	200	212 - 268		V150LA2	V150LA5	V150LA10A	V150LA20A	V240RA8	V240RA16	V240RA22
150	200	212 - 243					V150LA20B			
175	225	243 - 311	V270ZA05							
175	225	247 - 303		V175LA2	V175LA5	V175LA10A	V175LA20A	V270RA8	V270RA16	V270RA22
210	275	297 - 380	V330ZA05							
230	300	324 - 396	V360ZA05	V230LA4	V230LA10	V230LA20A	V230LA40A	V360RA8	V360RA16	
250	330	351 - 449	V390ZA05							
250	330	354 - 473		V250LA2						
250	330	354 - 429		V250LA4	V250LA10	V250LA20A	V250LA40A	V390RA8	V390RA16	V390RA22
250	330	354 - 413					V250LA40B			
275	369	387 - 495	V430ZA05							
275	369	389 - 515	V275LA2							
275	369	389 - 473		V274LA4	V275LA10	V275LA20A	V275LA40A	V430RA8	V430RA16	V430RA22
275	369	389 - 453					V275LA40B			
300	385	420 - 517	V470ZA05							
300	405	420 - 565		V300LA2						
300	405	420 - 517		V300LA4	V300LA10	V300LA20A	V300LA40A			
320	420	462 - 565		V320LA7	V320LA10	V320LA20A				
320	420	462 - 540					V320LA40B			
385	505	558 - 682	V620ZA05	V385LA7	V385LA10	V385LA20A	V385LA40B			
420	560	610 - 748	V680ZA05	V420LA7	V420LA10	V420LA20A				
420	560	610 - 720					V420LA40B			
440	585	643 - 787	V715ZA05							
460	615	702 - 858		V460LA7						
460	615	675 - 825	V750ZA05							

LA, ZA, AND RA SERIES NOMINAL VOLTAGE SELECTION (Continued)

VOLTAGE			LA, ZA SERIES					RA SERIES		
$V_{m(AC)}$	$V_{m(DC)}$	$V_{n(DC)}$	5mm	7mm	10mm	14mm	20mm	5 x 8mm	10 x 16mm	14 x 22mm
480	640	670 - 825		V480LA7	V480LA10	V480LA40A				
480	640	670 - 790					V480LA80B			
510	675	735 - 910			V510LA10	V510LA40A				
510	675	735 - 860					V510LA80B			
575	730	805 - 1000			V575LA10	V575LA40A				
575	730	805 - 960					V575LA80B			
625	825	940 - 1210			V625LA10	V625LA40A				
625	825	940 - 1100					V625LA80B			
660	850	940 - 1210			V660LA10	V660LA50A				
660	850	940 - 1100					V660LA100B			
1000	1200	1425 - 1800				V1000LA80A				
1000	1200	1425 - 1600					V1000LA160B			

AUML, MLE AND ML SERIES NOMINAL VOLTAGE SELECTION

VOLTAGE RATINGS					AUML AND ML SERIES				
$V_{m(AC)}$	$V_{m(DC)}$	$V_{n(DC)}$ MIN	$V_{n(DC)}$ MAX	0603 SIZE	0805 SIZE	1206 SIZE	1210 SIZE	1812 SIZE	2220 SIZE
2.5	3.5	3.7	5.5	V3.5MLA0603	V3.5MLA0805 V3.5MLA0805L	V3.5MLA1206			
4	5.5	7.1	9.3	V5.5MLA0603	V5.5MLA0805 V5.5MLA0805L	V5.5MLA1206			
6.5	9.0	11.0	16.0	V9MLA0603					
10	14	15.9	20.3	V14MLA0603	V14MLA0805 V14MLA0805L	V14MLA1206			
-	16	23	32				V18AUMLA1210	V18AUMLA1812	V18AUMLA2220
14	18	22	28	V18MLA0603 V18MLA0603 V18MLE0603	V18MLA0805 V18MLA0805L V18MLE0805	V18MLA1206 V18MLE1206	V18MLA1210		
20	26	29.5	38.5			V26MLA1206	V26MLA1210		
26	33	38	45			V33MLA1206			
30	42	46	56			V42MLA1206			
40	56	61	76			V56MLA1206			
50	68	76	90			V68MLA1206			

LA "C" III SERIES NOMINAL VOLTAGE SELECTION

VOLTAGE RATINGS			LA "C" III SERIES	
$V_{m(AC)}$	$V_{n(DC)}$ MIN	$V_{n(DC)}$ MAX	14mm	20mm
130	184	228	V130LA10C	V130LA20C
130	184	220		V130LA20CX325
140	198	242	V140LA10C	V140LA20C
140	198	230		V140LA20CX340
150	212	268	V150LA10C	V150LA20C
150	212	243		V150LA20CX360
175	247	303	V175LA10C	V175LA20C
175	247	285		V175LA20CX425
230	324	396	V230LA20C	V230LA40C
230	324	384		V230LA40CX570
250	354	429	V250LA20C	V250LA40C
250	354	413		V250LA40CX620
275	389	473	V275LA20C	V275LA40C
275	389	453		V275LA40CX680
300	400	540	V300LA20C	V300LA40C
300	400	520		V300LA40CX745
320	462	565	V320LA20C	V320LA40C

AS SERIES ARRESTER BLOCK VOLTAGE SELECTION

PARAMETER	MODEL NUMBER								UNITS
	V302AS32	V402AS32	V502AS32	V602AS32	V302AS42	V402AS42	V502AS42	V402AS60	
Rated Voltage (RMS)	3.0	4.0	5.0	6.0	3.0	4.0	5.0	4.0	kV
Maximum Continuous Operating Voltage (MCOV)	2.55	3.40	4.25	5.1	2.55	3.40	4.25	3.40	kV
Energy Rating at 60°C (2ms)	2.2	2.9	3.6	4.3	3.5	4.7	5.8	12.0	kJ
Peak Current, 4/10ms at 60°C	65.0	65.0	65.0	65.0	100.0	100.0	100.0	100.0	kA

Gas Discharge Tube Selection Guide

HAC SERIES GAS DISCHARGE TUBE ELECTRICAL SPECIFICATIONS

T_C at 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	HAC120, HAC120L			HAC240, 1fcHAC240L			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
DC Breakdown	V_{BD}	500V/s	225	-	-	425	-	-	V
Impulse Breakdown	V_{bd}	100V/µs	-	-	700	-	-	800	V
Insulation Resistance	IR	100V	10^{10}	-	-	10^{10}	-	-	Ω
Capacitance	C	1MHz	-	-	1.0	-	-	1.0	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	20	-	-	20	-	V
LIFE RATINGS:									
Max Current Surge		10kA (8/20µs)	4	-	-	4	-	-	Surges
AC Follow-On Current (Peak)		1/2 cycle at 60Hz	-	-	300	-	-	300	A

NOTE:

1. End-of-Life limits:
   DC: 50% of minimum initial DC breakdown voltage limit to150% of maximum initial DC breakdown voltage limit.
   Impulse: Less than 150% of initial impulse breakdown voltage limit.

HG SERIES GAS DISCHARGE TUBE ELECTRICAL SPECIFICATIONS

T_C at 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	HG75			HG90			HG110			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
DC Breakdown	V_{BD}	500V/s	60	75	90	72	90	108	88	110	132	V
Impulse Breakdown	V_{bd}	100V/µs	-	-	400	-	-	400	-	-	450	V
Insulation Resistance	IR	50V	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	Ω
Capacitance	C	1MHz	-	-	1	-	-	1	-	-	1	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	10	-	-	10	-	-	10	-	V
LIFE RATINGS:												
Surge Life	-	500A (10/1000µs)	1000	-	-	1000	-	-	1000	-	-	Surges
Max Current Surge	-	20kA (8/20µs)	5	-	-	5	-	-	5	-	-	Surges
AC Current	-	10x 1s at 60Hz	-	-	20	-	-		20	-	-	A
DC Holdover Voltage	-	Per REA PE-80, 0.2A	-	55	-	-	65	-	-	80	-	V

NOTE:

1. End-of-Life limits:
   DC: 50% of minimum initial DC breakdown voltage limit to150% of maximum initial DC breakdown voltage limit.
   Impulse: Less than 150% of initial impulse breakdown voltage limit.

HG2 SERIES GAS DISCHARGE TUBE ELECTRICAL SPECIFICATIONS

T_C at 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
			HG2-145			HG2-230			HG2-250			
DC Breakdown	V_{BD}	500V/s	116	145	174	195	230	265	213	250	288	V
Impulse Breakdown	V_{bd}	100V/µs	-	-	500	-	-	600	-	-	625	V
Insulation Resistance	IR	100V	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	Ω
Capacitance	C	1MHz	-	-	1	-	-	1	-	-	1	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	15	-	-	15	-	-	15	-	V

HG2 SERIES GAS DISCHARGE TUBE ELECTRICAL SPECIFICATIONS (Continued)

T_C at 25°C Unless Otherwise Specified **(Continued)**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
LIFE RATINGS:												
Surge Life	-	500A (10/1000µs)	1000	-	-	1000	-	-	1000	-	-	Surges
Max Current Surge	-	20kA (8/20µs)	5	-	-	5	-	-	5	-	-	Surges
AC Current	-	10x 1s at 60Hz	-	-	20	-	-	20	-	-	20	A
AC Follow-On Peak Current	-	1/2 Cycle at 60Hz	-	-	20	-	-	20	-	-	20	A
DC Holdover Voltage	-	Per REA PE-80, 0.2A	-	90	-	-	150	-	-	150	-	V
			HG2-300			**HG2-350**			**HG2-470**			
DC Breakdown	V_{BD}	500V/s	255	300	345	297	350	403	400	470	540	V
Impulse Breakdown	V_{bd}	100V/µs	-	-	700	-	-	750	-	-	850	V
Insulation Resistance	IR	100V	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	Ω
Capacitance	C	1MHz	-	-	1	-	-	1	-	-	1	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	15	-	-	15	-	-	15	-	V
LIFE RATINGS:												
Surge Life	-	500A (10/1000µs)	1000	-	-	1000	-	-	1000	-	-	Surges
Max Current Surge	-	20kA (8/20µs)	5	-	-	5	-	-	5	-	-	Surges
AC Current	-	10x 1s at 60Hz	-	-	20	-	-	20	-	-	20	A
AC Follow-On Peak Current	-	1/2 Cycle at 60Hz	-	-	20	-	-	20	-	-	20	A
DC Holdover Voltage	-	Per REA PE-80, 0.2A	-	150	-	-	150	-	-	150	-	V
			HG2-600			**HG2-800**			**HG2-1000**			
DC Breakdown	V_{BD}	500V/s	510	600	690	680	800	920	850	1000	1150	V
Impulse Breakdown	V_{bd}	100V/µs	-	-	1000	-	-	1200	-	-	1500	V
Insulation Resistance	IR	100V	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	Ω
Capacitance	C	1MHz	-	-	1	-	-	1	-	-	1	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	15	-	-	15	-	-	15	-	V
LIFE RATINGS:												
Surge Life	-	500A (10/1000µs)	1000	-	-	1000	-	-	1000	-	-	Surges
Max Current Surge	-	20kA (8/20µs)	10	-	-	10	-	-	10	-	-	Surges
AC Current	-	10x 1s at 60Hz	-	-	20	-	-	20	-	-	20	A
AC Follow-On Peak Current	-	1/2 Cycle at 60Hz	-	-	20	-	-	20	-	-	20	A
DC Holdover Voltage	-	Per REA PE-80, 0.2A	-	150	-	-	150	-	-	150	-	V

NOTE:

1. End-of-Life limits:
   DC: 50% of minimum initial DC breakdown voltage limit to150% of maximum initial DC breakdown voltage limit.
   Impulse: Less than 150% of initial impulse breakdown voltage limit.

HG2-SN SERIES GAS DISCHARGE TUBE ELECTRICAL SPECIFICATIONS

T_C at 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	HG2-230SN, HG2-230SNL			HG2-250SN, HG2-250SNL			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
DC Breakdown	V_{BD}	500V/s	184	230	276	200	250	300	V
Impulse Breakdown	V_{bd}	100V/µs	-	-	600	-	-	600	V
Insulation Resistance	IR	100VS	10^9	-	-	10^9	-	-	Ω
Capacitance	C	1MHz	-	-	1	-	-	1	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	10	-	-	10	-	V
LIFE RATINGS:									
Surge Life	-	500A (10/1000µs)	400	-	-	400	-	-	Surges
Max Current Surge	-	10kA (8/20µs)	10	-	-	10	-	-	Surges
AC Current	-	10x 1s at 60Hz	-	-	20	-	-	20	A
AC Follow-On Current (Peak)	-	1/2 Cycle at 60Hz	-	-	20	-	-	20	A
DC Holdover Voltage	-	Per REA PE-80, 0.2A	-	150	-	-	150	-	V

NOTE:

1. End-of-Life limits:
   DC: 50% of minimum initial DC breakdown voltage limit to150% of maximum initial DC breakdown voltage limit.
   Impulse: Less than 150% of initial impulse breakdown voltage limit.

HG2-SN SERIES GAS DISCHARGE TUBE ELECTRICAL SPECIFICATIONS (Continued)

T_C at 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	HG2-300SN, HG2-300SNL			HG2-350SN, HG2-350SNL			HG2-470SN, HG2-470SNL			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
DC Breakdown	V_{BD}	500V/s	240	300	360	280	350	420	376	470	564	V
Impulse Breakdown	V_{bd}	100V/µs	-	-	700	-	-	750	-	-	850	V
Insulation Resistance	IR	100V	10^9	-	-	10^9	-	-	10^9	-	-	Ω
Capacitance	C	1MHz	-	-	1	-	-	1	-	-	1	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	10	-	-	10	-	-	10	-	V
LIFE RATINGS:												
Surge Life	-	500A (10/1000µs)	400	-	-	400	-	-	400	-	-	Surges
Max Current Surge	-	10kA (8/20µs)	10	-	-	10	-	-	10	-	-	Surges
AC Current	-	10x 1s at 60Hz	-	-	20	-	-	20	-	-	20	A
AC Follow-On Current (Peak)	-	1/2 Cycle at 60Hz	-	-	20	-	-	20	-	-	20	A
DC Holdover Voltage	-	Per REA PE-80, 0.2A	-	150	-	-	150	-	-	150	-	V

NOTE:

1. End-of-Life limits:
   DC: 50% of minimum initial DC breakdown voltage limit to150% of maximum initial DC breakdown voltage limit.
   Impulse: Less than 150% of initial impulse breakdown voltage limit.

HG3 SERIES GAS DISCHARGE TUBE ELECTRICAL SPECIFICATIONS

T_C at 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	HG3-1.0, HG3-1.0L			HG3-1.5, HG3-1.5L			HG3-2.0, HG3-2.0L			HG3-2.5, HG3-2.5L			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
DC Breakdown	V_{BD}	500V/s	800	1000	1200	1200	1500	1800	1600	2000	2400	2000	2500	3000	V
Impulse Breakdown	V_{bd}	100V/µs	-	-	1500	-	-	2200	-	-	3000	-	-	3750	V
Insulation Resistance	IR	100V	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	Ω
Capacitance	C	1MHz	-	-	1	-	-	1	-	-	1	-	-	1	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	10	-	-	10	-	-	10	-	-	10	-	V
LIFE RATINGS:															
Surge Life	-	0.002µF, 100Ω	500	-	-	500	-	-	500	-	-	500	-	-	Surges
Max Current Surge	-	10kA (8/20µs)	5	-	-	5	-	-	5	-	-	5	-	-	Surges
AC Follow-On Current (Peak)	-	1/2 cycle at 60Hz	-	-	300	-	-	300	-	-	300	-	-	300	A

NOTE:

1. End-of-Life limits:
   DC: 50% of minimum initial DC breakdown voltage limit to150% of maximum initial DC breakdown voltage limit.
   Impulse: Less than 150% of initial impulse breakdown voltage limit.

HG3 SERIES GAS DISCHARGE TUBE ELECTRICAL SPECIFICATIONS

T_C at 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDI-TIONS	HG3-3.0, HG3-3.0L			HG3-4.0, HG3-4.0L			HG3-5.0, HG3-5.0L			HG3-7.5, HG3-7.5L			HG3-8.5, HG3-8.5L			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
DC Breakdown	V_{BD}	500V/S	2400	3000	3600	3200	4000	4800	4000	5000	6000	6000	7500	9000	6800	8500	10200	V
Impulse Breakdown	V_{bd}	100V/µs	-	-	4500	-	-	6000	-	-	7500	-	-	10000	-	-	13500	V
Insulation Resistance	IR	100V	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	Ω
Capacitance	C	1MHz	-	-	1	-	-	1	-	-	1	-	-	1	-	-	1	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	10	-	-	10	-	-	10	-	-	10	-	-	10	-	V
LIFE RATINGS:																		
Surge Life	-	0.002µF, 100Ω	500	-	-	500	-	-	500	-	-	500	-	-	500	-	-	Surges
Max Current Surge	-	10kA (8/20µs)	5	-	-	5	-	-	5	-	-	5	-	-	5	-	-	Surges
AC Follow-On Current (Peak)	-	1/2 Cycle at 60Hz	-	-	300	-	-	300	-	-	300	-	-	300	-	-	300	A

NOTE:

1. End-of-Life limits:
   DC: 50% of minimum initial DC breakdown voltage limit to150% of maximum initial DC breakdown voltage limit.
   Impulse: Less than 150% of initial impulse breakdown voltage limit.

HPMT3 SERIES GAS DISCHARGE TUBE ELECTRICAL SPECIFICATIONS

T_C at 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
			HPMT3-150XX			HPMT3-230XX			HPMT3-250XX			
DC Breakdown	$V_{BD(l-g)}$	500V/S	120	150	180	184	230	276	200	250	300	V
	$V_{BD(l-l)}$		-	-	360	-	-	552	-	-	600	V
Impulse Breakdown	$V_{bd(l-g)}$	100V/µs	-	-	500	-	-	600	-	-	600	V
Insulation Resistance	IR	100V	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	Ω
Capacitance	$C_{(l-g)}$	1MHz	-	-	1	-	-	1	-	-	1	pF
	$C_{(l-l)}$		-	-	0.5	-	-	0.5	-	-	0.5	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	16	-	-	16	-	-	16	-	V
LIFE RATINGS:												
Surge Life	-	500A, 10/1000µs	400	-	-	400	-	-	400	-	-	Surges
Max Current Surge	-	10kA + 10kA (8/20µs)	1	-	-	1	-	-	1	-	-	Surges
AC Current		11 Cycles at 60Hz	-	N/A	-	-	-	65+65	-	-	65+65	A
AC Follow-On Current (Peak)	-	1/2 Cycle at 60Hz	-	N/A	-	-	-	20	-	-	20	A
			HPMT3-350XX			HPMT3-400XX			HPMT3-500XX			
DC Breakdown	$V_{BD(l-g)}$	500V/S	280	350	420	320	400	480	400	500	600	V
	$V_{BD(l-l)}$		-	-	800	-	-	1000	-	-	1200	V
Impulse Breakdown	$V_{bd(l-g)}$	100V/µs	-	-	750	-	-	750	-	-	850	V
Insulation Resistance	IR	100V	10^{10}	-	-	10^{10}	-	-	10^{10}	-	-	Ω
Capacitance	$C_{(l-g)}$	1MHz	-	-	1	-	-	1	-	-	1	pF
	$C_{(l-l)}$		-	-	0.5	-	-	0.5	-	-	0.5	pF
Arc Voltage	V_{ARC}	I = 5A Min	-	16	-	-	16	-	-	16	-	V
LIFE RATINGS:												
Surge Life	-	500A, 10/1000µs	400	-	-	400	-	-	400	-	-	Surges
Max Current Surge	-	10kA + 10kA (8/20µs)	1	-	-	1	-	-	1	-	-	Surges
AC Current		11 Cycles at 60Hz	-	65+65	-	-	-	65+65	-	-	65+65	A
AC Follow-On Current (Peak)	-	1/2 Cycle at 60Hz	-	20	-	-	-	20	-	-	20	A

NOTE:

1. End-of-Life limits:
   DC: 50% of minimum initial DC breakdown voltage limit to150% of maximum initial DC breakdown voltage limit.
   Impulse: Less than 150% of initial impulse breakdown voltage limit.

Transient Voltage Suppression Device Ratings and Specifications

CP SERIES

MODEL NUMBER	PART SIZE	MAXIMUM RATINGS (125°C)				SPECIFICATIONS (25°C)						
		CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLTAGE V_C AT TEST CURRENT (8/20μs)		CAPACITANCE AT f = 1MHz	
		V_{RMS}	V_{DC}	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)							
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	I_P	MIN	MAX
		(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(A)	(pF)	(pF)
V8CP22	22B	6.0	8.0	1.5	250	12.5	16.0	19.5	34.0	10	1600	2950
V14CP22	22B	10.0	14.0	1.5	250	18.5	22.0	25.5	42.0	10	1600	2950
V31CP22	22B	25.0	31.0	1.5	250	35.0	39.0	48.0	85.0	5	450	1950
V38CP22	22B	30.0	38.0	1.5	250	42.0	47.0	58.0	100.0	5	450	1950
V130CP22	22A	130.0	130.0	2.4	300	184.0	200.0	228.0	375.0	5	150	350
V150CP22	22A	150.0	150.0	2.4	300	212.0	240.0	268.0	430.0	5	100	300
V31CP20	20B	25.0	31.0	2.0	300	35.0	39.0	48.0	85.0	10	700	2200
V38CP20	20B	30.0	38.0	2.0	300	42.0	47.0	58.0	100.0	10	650	1950
V130CP20	20A	130.0	130.0	3.0	400	184.0	200.0	228.0	375.0	10	150	400
V150CP20	20A	150.0	150.0	3.0	400	212.0	240.0	268.0	430.0	10	100	350
V38CP16	16A	30.0	38.0	3.0	350	42.0	47.0	58.0	100.0	20	1000	2750
V130CP16	16A	130.0	130.0	5.0	500	184.0	200.0	228.0	375.0	20	250	700
V150CP16	16A	150.0	150.0	5.0	500	212.0	240.0	268.0	430.0	20	200	650

NOTE:

1. Average power dissipation of transients not to exceed 250mW, 300mW and 350mW for sizes 22AWG, 20AWG and 16AWG, respectively.

CS SERIES

MODEL NUMBER	PART SIZE	MAXIMUM RATINGS (125°C)			SPECIFICATIONS (25°C)				
		CONTINUOUS	TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE V_C AT 10A (8/20μs)	CAPACITANCE AT f = 1MHz	
		V_{DC}	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)	$V_{N(DC)}$			C	
		$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	MAX	V_C	MIN	MAX
		(V)	(V)	(A)	(V)		(V)	(pF)	
V8CS22	22B	8	0.5	80	13.5	19.5	36	830	1550
V14CS22	22B	14	0.5	80	18.5	25.5	44	675	1250
V18CS22	22B	18	0.5	80	22.5	27.9	47	600	1200
V22CS22	22B	22	0.5	100	27.5	34.5	57	540	1050
V26CS22	22B	26	0.5	100	29.5	36.5	68	510	960
V31CS22	22B	31	0.5	100	35.0	48.0	85	450	880
V38CS22	22B	38	0.5	100	42.0	58.0	100	350	770

CH SERIES

V82 - V240 CH Varistors are listed under UL file No. E75961 as a recognized component.
Series CH Varistors are listed under UL file No. E135010 as a recognized component.

MODEL NUMBER	MAXIMUM RATINGS (125°C)				SPECIFICATIONS (25°C)					
	CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLT V_C AT TEST CURRENT (8/20μs)		TYPICAL CAPACITANCE
	V_{RMS}	V_{DC}	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)	MIN	$V_{N(DC)}$	MAX	V_C	I_P	f = 1MHz
	$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}						
	(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(A)	(pF)
V22CH8	14	18 (Note 3)	10.0 (Note 2)	250	18.7	22.0	26.0	47	5	1600
V27CH8	17	22	1.0	250	23.0	27.0	31.1	57	5	1300
V33CH8	20	26	1.2	250	29.5	33.0	36.5	68	5	1100
V39CH8	25	31	1.5	250	35.0	39.0	43.0	79	5	900
V47CH8	30	38	1.8	250	42.0	47.0	52.0	92	5	800
V56CH8	35	45	2.3	250	50.0	56.0	62.0	107	5	700
V120CH8	75	102	6.0	500	108.0	120.0	132.0	200	10	300
V150CH8	95	127	8.0	500	135.0	150.0	165.0	250	10	250
V180CH8	115	153	10.0	500	162.0	180.0	198.0	295	10	200
V200CH8	130	175	11.0	500	184.0	200.0	228.0	340	10	180
V220CH8	140	180	12.0	500	198.0	220.0	242.0	360	10	160
V240CH8	150	200	13.0	500	212.0	240.0	268.0	395	10	150
V360CH8	230	300	20.0	500	324.0	360.0	396.0	595	10	100
V390CH8	250	330	21.0	500	354.0	390.0	429.0	650	10	90
V430CH8	275	369	23.0	500	389.0	430.0	473.0	710	10	80

NOTES:

1. Power dissipation of transients not to exceed 0.25W.
2. Energy rating for impulse duration of 30ms minimum to one half of peak current value.
3. Also rated to withstand 24V for 5 minutes.

ZA SERIES

ZA Series Varistors are listed under UL File No. E135010 as a recognized component.

(NOTE 5) MODEL NUMBER	MODEL SIZE DISC DIA. (mm)	DEVICE MARKING	MAXIMUM RATING (85°C)				SPECIFICATIONS (25°C)				
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE 8 x 20μs		TYPICAL CAPACITANCE f = 1MHz
			V_{RMS}	V_{DC}	ENERGY 10 x 1000μs	PEAK CURRENT 8 x 20μs					
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	V_{NOM} MIN	V_{NOM} MAX	V_C	I_{PK}	C
			(V)	(V)	(J)	(A)	(V)		(V)	(A)	(pF)
V8ZA05	5	Z08	4	5.5	0.1	50	6	11	30	1	1400
V8ZA1	7	08Z1	4	5.5	0.4	100	6	11	22	2.5	3000
V8ZA2	10	08Z2	4	5.5	0.8	250	6	11	20	5	7500

ZA SERIES (Continued)

ZA Series Varistors are listed under UL File No. E135010 as a recognized component.

(NOTE 5) MODEL NUMBER	MODEL SIZE DISC DIA. (mm)	DEVICE MARKING	MAXIMUM RATING (85°C)				SPECIFICATIONS (25°C)				
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE 8 x 20μs		TYPICAL CAPACITANCE f = 1MHz
			V_{RMS}	V_{DC}	ENERGY 10 x 1000μs	PEAK CURRENT 8 x 20μs					
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	V_{NOM} MIN	V_{NOM} MAX	V_C	I_{PK}	C
			(V)	(V)	(J)	(A)	(V)		(V)	(A)	(pF)
V12ZA05	5	Z12	6	8	0.14	50	9	16	37	1	1200
V12ZA1	7	12Z1	6	8	0.6	100	9	16	34	2.5	2500
V12ZA2	10	12Z2	6	8	1.2	250	9	16	30	5	6000
V18ZA05	5	Z18	10	14	0.17	100	14.4	21.6	36	1	1000
V18ZA1	7	18Z1	10	14	0.8	250	14.4	21.6	36	2.5	2000
V18ZA2	10	18Z2	10	14	1.5	500	14.4	21.6	36	5	5000
V18ZA3	14	18Z3	10	14	3.5	1000	14.4	21.6	36	10	11000
V18ZA40	20	18Z40	10	14	80 (Note 2)	2000	14.4 (Note 3)	21.6	37	20	22000
V22ZA05	5	Z22	14	18	0.2	100	18.7	26	43	1	800
V22ZA1	7	22Z1	14	18	0.9	250	18.7	26	43	2.5	1600
V22ZA2	10	22Z2	14	18	2	500	18.7	26	43	5	4000
V22ZA3	14	22Z3	14	18	4	1000	18.7	26	43	10	9000
V24ZA50	20	24Z50	14	18 (Note 4)	100 (Note 2)	2000	19.2 (Note 3)	26	43	20	18000
V27ZA05	5	Z27	17	22	0.25	100	23	31.1	53	1	600
V27ZA1	7	27Z1	17	22	1	250	23	31.1	53	2.5	1300
V27ZA2	10	27Z2	17	22	2.5	500	23	31.1	53	5	3000
V27ZA4	14	27Z4	17	22	5	1000	23	31.1	53	10	7000
V27ZA60	20	27Z60	17	22	120 (Note 2)	2000	23 (Note 3)	31.1	50	20	13000
V33ZA05	5	Z33	20	26	0.3	100	29.5	38	65	1	500
V33ZA1	7	33Z1	20	26	1.2	250	29.5	36.5	65	2.5	1100
V33ZA2	10	33Z2	20	26	3	500	29.5	36.5	65	5	2700
V33ZA5	14	33Z5	20	26	6	1000	29.5	36.5	65	10	6000
V33ZA70	20	33Z70	21	27	150 (Note 2)	2000	29.5 (Note 3)	36.5	58	20	13000
V36ZA80	20	36Z80	23	31	160 (Note 2)	2000	32 (Note 3)	40	63	20	12000
V39ZA05	5	Z39	25	31	0.3	100	35	46	79	1	500
V39ZA1	7	39Z1	25	31	1.2	250	35	43	79	2.5	1100
V39ZA3	10	39Z3	25	31	3	500	35	43	76	5	2700

ZA SERIES (Continued)

ZA Series Varistors are listed under UL File No. E135010 as a recognized component.

(NOTE 5) MODEL NUMBER	MODEL SIZE DISC DIA. (mm)	DEVICE MARKING	MAXIMUM RATING (85°C)				SPECIFICATIONS (25°C)				
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE 8 x 20μs		TYPICAL CAPACITANCE f = 1MHz
			V_{RMS}	V_{DC}	ENERGY 10 x 1000μs	PEAK CURRENT 8 x 20μs					
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	V_{NOM} MIN	V_{NOM} MAX	V_C	I_{PK}	C
			(V)	(V)	(J)	(A)	(V)		(V)	(A)	(pF)
V39ZA6	14	39Z6	25	31	6	1000	35	43	76	10	6000
V39ZA20	20	39Z20	25	31	20	2000	35	43	76	20	12000
V47ZA05	5	Z47	30	38	0.4	100	42	55	93	1	400
V47ZA1	7	47Z1	30	38	1.8	250	42	52	93	2.5	800
V47ZA3	10	47Z3	30	38	4.5	500	42	52	93	5	2000
V47ZA7	14	47Z7	30	38	8.8	1000	42	52	93	10	4500
V47ZA20	20	47Z20	30	38	23	2000	42	52	93	20	11000
V56ZA05	5	Z56	35	45	0.5	100	50	66	110	1	360
V56ZA2	7	56Z2	35	45	2.3	250	50	62	110	2.5	700
V56ZA3	10	56Z3	35	45	5.5	500	50	62	110	5	1800
V56ZA8	14	56Z8	35	45	10	1000	50	62	110	10	3900
V56ZA20	20	56Z20	35	45	30	2000	50	62	110	20	10000
V68ZA05	5	Z68	40	56	0.6	100	61	80	135	1	300
V68ZA2	7	68Z2	40	56	3	250	61	75	135	2.5	600
V68ZA3	10	68Z3	40	56	6.5	500	61	75	135	5	1500
V68ZA10	14	68Z10	40	56	13	1000	61	75	135	10	3300
V68ZA20	20	68Z20	40	56	33	2000	61	75	135	20	10000
V82ZA05	5	Z82	50	68	2	400	73	97	135	5	240
V82ZA2	7	82Z2	50	68	4	1200	73	91	135	10	500
V82ZA4	10	82Z4	50	68	8	2500	73	91	135	25	1100
V82ZA12	14	82Z12	50	68	15	4500	73	91	145	50	2500
V100ZA05	5	Z100	60	81	2.5	400	90	117	165	5	180
V100ZA3	7	100Z	60	81	5	1200	90	110	165	10	400
V100ZA4	10	100Z4	60	81	10	2500	90	110	165	25	900
V100ZA15	14	100Z15	60	81	20	4500	90	110	175	50	2000
V120ZA05	5	Z120	75	02	3	400	108	138	205	5	140
V120ZA1	7	120Z	75	02	6	1200	108	132	205	10	300
V120ZA4	10	120Z4	75	102	12	2500	108	132	200	25	750
V120ZA6	14	120Z6	75	102	22	4500	108	132	210	50	1700
V120ZA20	20	120Z20	75	102	33	6500	108	132	210	100	1500

ZA SERIES (Continued)

ZA Series Varistors are listed under UL File No. E135010 as a recognized component.

(NOTE 5) MODEL NUMBER	MODEL SIZE DISC DIA. (mm)	DEVICE MARKING	MAXIMUM RATING (85°C)				SPECIFICATIONS (25°C)				
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE 8 x 20μs		TYPICAL CAPACITANCE f = 1MHz
			V_{RMS}	V_{DC}	ENERGY 10 x 1000μs	PEAK CURRENT 8 x 20μs					
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	V_{NOM} MIN	V_{NOM} MAX	V_C	I_{PK}	C
			(V)	(V)	(J)	(A)	(V)		(V)	(A)	(pF)
V150ZA05	5	Z150	92	127	4	400	135	173	250	5	120
V150ZA1	7	Z051	95	127	8	1200	135	165	250	10	250
V150ZA4	10	150Z4	95	127	15	2500	135	165	250	25	600
V150ZA8	14	150Z8	95	127	20	4500	135	165	250	50	1400
V150ZA20	20	150Z20	95	127	45	6500	135	165	250	100	1000
V180ZA05	5	Z180	110	153	5	400	162	207	295	5	100
V180ZA1	7	180Z	115	153	10	1200	162	198	300	10	200
V180ZA5	10	180Z5	115	153	18	2500	162	198	300	25	500
V180ZA10	14	180Z10	115	153	35	4500	162	198	300	50	1100
V180ZA20	20	180Z20	115	153	52	6500	162	198	300	100	2400
V205ZA05	5	Z205	130	170	5.5	400	184	226	340	5	100
V220ZA05	5	Z220	140	180	6	400	198	253	360	5	90
V240ZA05	5	Z240	150	200	7	400	216	264	395	5	80
V270ZA05	5	Z270	175	225	7.5	400	243	311	455	5	70
V330ZA05	5	Z330	210	275	9	400	297	380	540	5	60
V360ZA05	5	Z360	230	300	9.5	400	324	396	595	5	55
V390ZA05	5	Z390	250	330	10	400	351	449	650	5	50
V430ZA05	5	Z430	275	369	11	400	387	495	710	5	45
V470ZA05	5	Z470	300	385	12	400	420	517	775	5	35
V620ZA05	5	Z620	385	505	13	400	558	682	1025	5	33
V680ZA05	5	Z680	420	560	14	400	610	748	1120	5	32
V715ZA05	5	Z715	440	585	15.5	400	643	787	1180	5	31
V750ZA05	5	Z750	460	615	17	400	675	825	1240	5	30

NOTES:

1. Average power dissipation of transients not to exceed 0.2W, 0.25W, 0.4W, 0.6W or 1W for model sizes 5mm, 7mm, 10mm, 14mm and 20mm, respectively.
2. Energy rating for impulse duration of 30ms minimum to one half of peak current.
3. 10mA DC test current.
4. Also rated to withstand 24V for 5 minutes.
5. Higher voltages available, contact Harris Semiconductor Power Marketing.

RA SERIES

Series RA8 Varistors of 130V_{RMS} or greater are listed under UL File No. E75961 as a recognized component. CSA approved File No. LR91788.

MODEL NUMBER	DEVICE MARKING	MAXIMUM RATINGS (125°C)				SPECIFICATIONS (25°C)					
		CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLTAGE V_C AT TEST CURRENT (8/20μs)		TYPICAL CAPACITANCE
		V_{RMS}	V_{DC}	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)						
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	I_P	f = 1MHz
		(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(A)	(pF)
V8RA8	8R	4	5.5	0.4	150	6	8.2	11.2	22	5	3000
V12RA8	12R	6	8	0.6	150	9	12	16	34	5	2500
V18RA8	18R	10	14	0.8	250	14.4	18	21.6	42	5	2000
V22RA8	22R	14	18 (Note 3)	10 (Note 2)	250	18.7	22	26	47	5	1600
V27RA8	27R	17	22	1.0	250	23	27	31.1	57	5	1300
V33RA8	33R	20	26	1.2	250	29.5	33	36.5	68	5	1100
V39RA8	39R	25	31	1.5	250	35	39	43	79	5	900
V47RA8	47R	30	38	1.8	250	42	47	52	92	5	800
V56RA8	56R	35	45	2.3	250	50	56	62	107	5	700
V68RA8	68R	40	56	3.0	250	61	68	75	127	5	600
V82RA8	82R	50	66	4.0	1200	74	82	91	135	10	500
V100RA8	100R	60	81	5.0	1200	90	100	110	165	10	400
V120RA8	120R	75	102	6.0	1200	108	120	132	205	10	300
V150RA8	150R	95	127	8.0	1200	135	150	165	250	10	250
V180RA8	180R	115	153	10.0	1200	162	180	198	295	10	200
V200RA8	200R	130	175	11.0	1200	184	200	228	340	10	180
V220RA8	220R	140	180	12.0	1200	198	220	242	360	10	160
V240RA8	240R	150	200	13.0	1200	212	240	268	395	10	150
V270RA8	270R	175	225	15.0	1200	247	270	303	455	10	130
V360RA8	360R	230	300	20.0	1200	324	360	396	595	10	100
V390RA8	390R	250	330	21.0	1200	354	390	429	650	10	90
V430RA8	430R	275	369	23.0	1200	389	430	473	710	10	80

NOTES:

1. Average power dissipation of transients not to exceed 0.25W for RA8 Series.
2. Energy ratings for impulse duration of 30ms minimum to one half of peak current value.
3. Also rated to withstand 24V for 5 minutes.

LA SERIES

Series LA Varistors are listed under UL file No. E75961 and E56529 as a recognized component.
Series LA Varistors are listed under CSA file No. LR91788 as a recognized component.

MODEL NUMBER	MODEL SIZE DISC DIA. (mm)	DEVICE MARKING	MAXIMUM RATING (85°C)				SPECIFICATIONS (25°C)				
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE 8 x 20μs		TYPICAL CAPACI-TANCE f = 1MHz
			V_{RMS}	V_{DC}	ENERGY 10 x 1000μs	PEAK CURRENT 8 x 20μs					
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	V_{NOM} MIN	V_{NOM} MAX	V_C	I_{PK}	C
			(V)	(V)	(J)	(A)	(V)		(V)	(A)	(pF)
V130LA1	7	1301	130	175	11	1200	184	255	390	10	180
V130LA2	7	1302	130	175	11	1200	184	228	340	10	180
V130LA5	10	1305	130	175	20	2500	184	228	340	25	450
V130LA10A	14	130L10	130	175	38	4500	184	228	340	50	1000
V130LA20A	20	130L20	130	175	70	6500	184	228	340	100	1900
V130LA20B	20	130L20B	130	175	70	6500	184	220	325	100	1900
V140LA2	7	1402	140	180	12	1200	198	242	360	10	160
V140LA5	10	1405	140	180	22	2500	198	242	360	25	400
V140LA10A	14	140L10	140	180	42	4500	198	242	360	50	900
V140LA20A	20	140L20	140	180	75	6500	198	242	340	100	1750
V150LA1	7	1501	150	200	13	1200	212	284	430	10	150
V150LA2	7	1502	150	200	13	1200	212	268	395	10	150
V150LA5	10	1505	150	200	25	2500	212	268	395	25	360
V150LA10A	14	150L10	150	200	45	4500	212	268	395	50	800
V150LA20A	20	150L20	150	200	80	6500	212	268	395	100	1600
V150LA20B	20	150L20B	150	200	80	6500	212	243	360	100	1600
V175LA2	7	1752	175	225	15	1200	247	303	455	10	130
V175LA5	10	1755	175	225	30	2500	247	303	455	25	350
V175LA10A	14	175L10	175	225	55	4500	247	303	455	50	700
V175LA20A	20	175L20	175	225	90	6500	247	303	455	100	1400
V230LA4	7	2304	230	300	20	1200	324	396	595	10	100
V230LA10	10	230L	230	300	35	2500	324	396	595	25	250
V230LA20A	14	230L20	230	300	70	4500	324	396	595	50	550
V230LA40A	20	230L40	230	300	122	6500	324	396	595	50	1100
V250LA2	7	2502	250	330	21	1200	354	473	730	10	90
V250LA4	7	2504	250	330	21	1200	354	429	650	10	90
V250LA10	10	250L	250	330	40	2500	354	429	650	25	220
V250LA20A	14	250L20	250	330	72	4500	354	429	650	50	500
V250LA40A	20	250L40	250	330	130	6500	354	429	650	100	1000
V250LA40B	20	250L40B	250	330	130	6500	354	413	620	100	1000
V275LA2	7	2752	275	369	23	1200	389	515	775	10	80
V275LA4	7	2754	275	369	23	1200	389	473	710	10	80

LA SERIES (Continued)

Series LA Varistors are listed under UL file No. E75961 and E56529 as a recognized component.
Series LA Varistors are listed under CSA file No. LR91788 as a recognized component.

MODEL NUMBER	MODEL SIZE DISC DIA. (mm)	DEVICE MARKING	MAXIMUM RATING (85°C)				SPECIFICATIONS (25°C)				
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE 8 x 20μs		TYPICAL CAPACI-TANCE f = 1MHz
			V_{RMS}	V_{DC}	ENERGY 10 x 1000μs	PEAK CURRENT 8 x 20μs					
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	V_{NOM} MIN	V_{NOM} MAX	V_C	I_{PK}	C
			(V)	(V)	(J)	(A)	(V)		(V)	(A)	(pF)
V275LA10	10	275L	275	369	45	2500	389	473	710	25	200
V275LA20A	14	275L20	275	369	75	4500	389	473	710	50	450
V275LA40A	20	275L40	275	369	140	6500	389	473	710	100	900
V275LA40B	20	275L40B	275	369	140	6500	389	453	680	100	900
V300LA2	7	3002	300	405	25	1200	420	565	870	10	70
V300LA4	7	3004	300	405	25	1200	420	517	775	10	70
V300LA10	10	300L	300	405	46	2500	420	517	775	25	180
V300LA20A	14	300L20	300	405	77	4500	420	517	775	50	400
V300LA40A	20	300L40	300	405	165	6500	420	517	775	100	800
V320LA7	7	3207	320	420	25	1200	462	565	850	10	65
V320LA10	10	320L	320	420	48	2500	462	565	850	25	170
V320LA20A	14	320L20	320	420	80	4500	462	565	850	50	380
V320LA40B	20	320L40	320	420	150	6500	462	540	810	100	750
V385LA7	7	3857	385	505	27	1200	558	682	1025	10	60
V385LA10	10	385L	385	505	51	2500	558	682	1025	25	160
V385LA20A	14	385L20	385	505	85	4500	558	682	1025	50	360
V385LA40B	20	385L40	385	505	160	6500	558	682	1025	100	700
V420LA7	7	4207	420	560	30	1200	610	748	1120	10	55
V420LA10	10	420L	420	560	55	2500	610	748	1120	25	140
V420LA20A	14	420L20	420	560	90	4500	610	748	1120	50	300
V420LA40B	20	420L40	420	560	160	6500	610	720	1060	100	600
V460LA7	7	4607	460	615	37	1200	702	858	1130	10	55
V480LA7	7	4807	480	640	35	1200	670	825	1240	10	270
V480LA10	10	480L	480	640	60	2500	670	825	1240	25	120
V480LA40A	14	480L40	480	640	105	4500	670	825	1240	50	270
V480LA80B	20	480L80	480	640	180	6500	670	790	1160	100	550
V510LA10	10	510L	510	675	63	2500	735	910	1350	25	100
V510LA40A	14	510L40	510	675	110	4500	735	910	1350	50	250
V510LA80B	20	510L80	510	675	190	6500	735	860	1280	100	500
V575LA10	10	575L	575	730	65	2500	805	1000	1500	25	90
V575LA40A	14	575L40	575	730	120	4500	805	1000	1500	50	220
V575LA80B	20	575L80	575	730	220	6500	805	960	1410	100	450

LA SERIES (Continued)

Series LA Varistors are listed under UL file No. E75961 and E56529 as a recognized component.
Series LA Varistors are listed under CSA file No. LR91788 as a recognized component.

MODEL NUMBER	MODEL SIZE DISC DIA. (mm)	DEVICE MARKING	MAXIMUM RATING (85°C)				SPECIFICATIONS (25°C)				
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE 8 x 20μs		TYPICAL CAPACITANCE f = 1MHz
			V_{RMS}	V_{DC}	ENERGY 10 x 1000μs	PEAK CURRENT 8 x 20μs					
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	V_{NOM} MIN	V_{NOM} MAX	V_C	I_{PK}	C
			(V)	(V)	(J)	(A)	(V)		(V)	(A)	(pF)
V625LA10	10	625L	625	825	67	2500	940	1210	1820	25	80
V625LA40A	14	625L40	625	825	125	4500	940	1210	1820	50	210
V625LA80B	20	625L80	625	825	230	6500	940	1100	1650	100	425
V660LA10	10	660L	660	850	70	2500	940	1210	1820	50	70
V660LA50A	14	660L50	660	850	140	4500	940	1210	1820	50	200
V660LA100B	20	660L100	660	850	250	6500	940	1100	1650	100	400
V1000LA80A	14	1000L80	1000	1200	220	4500	1425	1800	2700	50	130
V1000LA160B	20	1000L160	1000	1200	360	6500	1425	1600	2420	100	250

NOTE:

1. Average power dissipation of transients not to exceed 0.25W, 0.4W, 0.6W or 1W for model sizes 7mm, 10mm, 14mm and 20mm, respectively.

"C" III SERIES RATINGS

MODEL NUMBER	DEVICE MARKING	MAXIMUM RATINGS (85°C)			
		CONTINUOUS	TRANSIENT		
		MAXIMUM V_{RMS} $V_{M(AC)}$ (V)	WITHSTANDING ENERGY (2ms) W_{TM} (⎍⎍) (J)	PEAK CURRENT (8/20μs)	
				I_{TM1} 1 PULSE (A)	I_{TM2} 2 PULSES (A)
V130LA10C	130L10C	130	45	6000	5000
V130LA20C	130L20C	130	90	9000	7000
V130LA20CX325	130CX325	130	90	9000	7000
V140LA10C	140L10C	140	50	6000	5000
V140LA20C	140L20C	140	100	9000	7000
V140LA20CX340	140CX340	140	100	9000	7000
V150LA10C	150L10C	150	55	6000	5000
V150LA20C	150L20C	150	110	9000	7000
V150LA20CX360	150CX360	150	110	9000	7000
V175LA10C	175L10C	175	60	6000	5000
V175LA20C	175L20C	175	120	9000	7000
V175LA20CX425	175CX425	175	120	9000	7000
V230LA20C	230L20C	230	80	6000	5000
V230LA40C	230L40C	230	160	9000	7000
V230LA40CX570	230X570	230	160	9000	7000
V250LA20C	250L20C	250	100	6000	5000
V250LA40C	250L40C	250	170	9000	7000
V250LA40CX620	250CX620	250	170	9000	7000

"C" III SERIES RATINGS (Continued)

MODEL NUMBER	DEVICE MARKING	MAXIMUM RATINGS (85°C)			
		CONTINUOUS	TRANSIENT		
		MAXIMUM V_{RMS} $V_{M(AC)}$ (V)	WITHSTANDING ENERGY (2ms) W_{TM} (⎍⎍) (J)	PEAK CURRENT (8/20μs)	
				I_{TM1} 1 PULSE (A)	I_{TM2} 2 PULSES (A)
V275LA20C	275L20C	275	110	6000	5000
V275LA40C	275L40C	275	220	9000	7000
V275LA40CX680	275CX680	275	220	9000	7000
V300LA20C	300L20C	300	120	6000	5000
V300LA40C	300L40C	300	210	9000	7000
V300LA40CX745	300CX745	300	210	9000	7000
V320LA20C	320L20C	320	200	6000	5000
V320LA40C	320L40C	320	200	9000	7000

"C" III SERIES SPECIFICATIONS

MODEL NUMBER	MODEL SIZE DISC DIAMETER (mm)	SPECIFICATIONS (25°C)					
		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE (8/20μs)		DUTY CYCLE SURGE RATING	
		V_N MIN (V)	V_N MAX (V)	V_C (V)	I_p (A)	3kA (8/20μs) # PULSES	750A (8/20μs) # PULSES
V130LA10C	14	184	228	340	50	10	80
V130LA20C	20	184	228	340	100	20	120
V130LA20CX325	20	184	220	325	100	20	120
V140LA10C	14	198	242	360	50	10	80
V140LA20C	20	198	242	360	100	20	120
V140LA20CX340	20	198	230	340	100	20	120
V150LA10C	14	212	268	395	50	10	80
V150LA20C	20	212	268	395	100	20	120
V150LA20CX360	20	212	243	360	100	20	120
V175LA10C	14	247	303	455	50	10	80
V175LA20C	20	247	303	455	100	20	120
V175LA20CX425	20	247	285	425	100	20	120
V230LA20C	14	324	396	595	50	10	80
V230LA40C	20	324	396	595	100	20	120
V230LA40CX570	20	324	384	570	100	20	120
V250LA20C	14	354	429	650	50	10	80
V250LA40C	20	354	429	650	100	20	120
V250LA40CX620	20	354	413	620	100	20	120
V275LA20C	14	389	473	710	50	10	80
V275LA40C	20	389	473	710	100	20	120
V275LA40CX680	20	389	453	680	100	20	120
V300LA20C	14	420	517	775	50	10	80
V300LA40C	20	420	517	775	100	20	120
V300LA40CX745	20	420	480	745	100	20	120
V320LA20C	14	462	565	850	50	10	80
V320LA40C	20	462	565	850	100	20	120

NOTE:

1. Average power dissipation of transients not to exceed 0.6W and 1W for model sizes 14mm and 20mm, respectively

ULTRAMOV SERIES

MODEL NUMBER	DEVICE MODEL NUMBER BRAND-ING	MAXIMUM RATING (85°C)					SPECIFICATIONS (25°C)				
		CONTINUOUS		TRANSIENT			VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE 8 x 20μs		TYPICAL CAPACI-TANCE
		RMS VOLTS	DC VOLTS	ENERGY 2ms	PEAK CURRENT 8 x 20μs						
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM} 2 x PULSE	I_{TM} 1 x PULSE	V_{NOM} MIN	V_{NOM} MAX	V_C	I_{PK}	f = 1MHz
		(V)	(V)	(J)	(A)	(A)	(V)		(V)	(A)	(pF)
V07E130	7V130	130	170	12.5	1200	1750	184	226	340	10	180
V10E130	10V130	130	170	25	2500	3500	184	226	340	25	450
V14E130	14V130	130	170	50	4500	6000	184	226	340	50	1000
V20E130	20V130	130	170	100	6500	10000	184	226	340	100	1900
V07E140	7V140	140	180	13.5	1200	1750	200	240	360	10	160
V10E140	10V140	140	180	27.5	2500	3500	200	240	360	25	400
V14E140	14V140	140	180	55	4500	6000	200	240	360	50	900
V20E140	20V140	140	180	110	6500	10000	200	240	360	100	1750
V07E150	7V150	150	200	15	1200	1750	216	264	395	10	150
V10E150	10V150	150	200	30	2500	3500	216	264	395	25	360
V14E150	14V150	150	200	60	4500	6000	216	264	395	50	800
V20E150	20V150	150	200	120	6500	10000	216	264	395	100	1600
V07E175	7V175	175	225	17	1200	1750	243	297	455	10	130
V10E175	10V175	175	225	35	2500	3500	243	297	455	25	350
V14E175	14V175	175	225	70	4500	6000	243	297	455	50	700
V20E175	20V175	175	225	135	6500	10000	243	297	455	100	1400
V07E230	7V230	230	300	20	1200	1750	324	396	595	10	100
V10E230	10V230	230	300	42	2500	3500	324	396	595	25	250
V14E230	14V230	230	300	80	4500	6000	324	396	595	50	550
V20E230	20V230	230	300	160	6500	10000	324	396	595	100	1100
V07E250	7V250	250	320	25	1200	1750	351	429	650	10	90
V10E250	10V250	250	320	50	2500	3500	351	429	650	25	220
V14E250	14V250	250	320	100	4500	6000	351	429	650	50	500
V20E250	20V250	250	320	170	6500	10000	351	429	650	100	1000
V07E275	7V275	275	350	28	1200	1750	387	473	710	10	80
V10E275	10V275	275	350	55	2500	3500	387	473	710	25	200
V14E275	14V275	275	350	110	4500	6000	387	473	710	50	450
V20E275	20V275	275	350	190	6500	10000	387	473	710	100	900
V07E300	7V300	300	385	30	1200	1750	423	517	775	10	70
V10E300	10V300	300	385	60	2500	3500	423	517	775	25	180
V14E300	14V300	300	385	125	4500	6000	423	517	775	50	400
V20E300	20V300	300	385	250	6500	10000	423	517	775	100	800
V07E320	7V320	320	420	32	1200	1750	459	561	840	10	65
V10E320	10V320	320	420	67	2500	3500	459	561	840	25	170
V14E320	14V320	320	420	136	4500	6000	459	561	840	50	380
V20E320	20V320	320	420	273	6500	10000	459	561	840	100	750
V07E385	7V385	385	505	36	1200	1750	558	682	1025	10	60
V10E385	10V385	385	505	75	2500	3500	558	682	1025	25	160
V14E385	14V385	385	505	150	4500	6000	558	682	1025	50	360
V20E385	20V385	385	505	300	6500	10000	558	682	1025	100	700

ULTRAMOV SERIES (Continued)

MODEL NUMBER	DEVICE MODEL NUMBER BRAND-ING	MAXIMUM RATING (85°C)					SPECIFICATIONS (25°C)				
		CONTINUOUS		TRANSIENT			VARISTOR VOLTAGE AT 1mA DC TEST CURRENT		MAXIMUM CLAMPING VOLTAGE 8 x 20μs		TYPICAL CAPACI-TANCE
		RMS VOLTS	DC VOLTS	ENERGY 2ms	PEAK CURRENT 8 x 20μs						
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM} 2 x PULSE	I_{TM} 1 x PULSE	V_{NOM} MIN	V_{NOM} MAX	V_C	I_{PK}	f = 1MHz
		(V)	(V)	(J)	(A)	(A)	(V)		(V)	(A)	(pF)
V07E420	7V420	420	560	40	1200	1750	612	748	1120	10	55
V10E420	10V420	420	560	80	2500	3500	612	748	1120	25	140
V14E420	14V420	420	560	160	4500	6000	612	748	1120	50	300
V20E420	20V420	420	560	320	6500	10000	612	748	1120	100	600
V07E440	7V440	440	585	44	1200	1750	643	787	1180	10	50
V10E440	10V440	440	585	85	2500	3500	643	787	1180	25	130
V14E440	14V440	440	585	170	4500	6000	643	787	1180	50	260
V20E440	20V440	440	585	340	6500	10000	643	787	1180	100	500
V07E460	7V460	460	615	48	1200	1750	675	825	1240	10	45
V10E460	10V460	460	615	90	2500	3500	675	825	1240	25	120
V14E460	14V460	460	615	180	4500	6000	675	825	1240	50	220
V20E460	20V460	460	615	360	6500	10000	675	825	1240	100	400
V10E510	10V510	510	670	80	2500	3500	738	902	1355	25	110
V14E510	14V510	510	670	165	4500	6000	738	902	1355	50	200
V20E510	20V510	510	670	325	6500	10000	738	902	1355	100	350
V10E550	10V550	550	745	90	2500	3500	901	1001	1500	25	100
V14E550	14V550	550	745	180	4500	6000	901	1001	1500	50	180
V20E550	20V550	550	745	360	6500	10000	901	1001	1500	100	300
V10E625	10V625	625	825	100	2500	3500	900	1100	1650	25	90
V14E625	14V625	625	825	200	4500	6000	900	1100	1650	50	160
V20E625	20V625	625	825	400	6500	10000	900	1100	1650	100	250

NOTE:

1. Average power dissipation of transients should not exceed 0.25W, 0.4W, 0.6W and 1.0W for 7mm, 10mm, 14mm, and 20mm model sizes, respectively.

MA SERIES

MODEL NUMBER	DEVICE MARK-ING	MAXIMUM RATINGS (85°C)				SPECIFICATIONS (25°C)				
		CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLT AT I_P VALUE CURRENT (8/20μs)	TYPICAL CAPACI-TANCE
		V_{RMS}	V_{DC}	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)					
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	I_P = 2.0A	f = 1MHz
		(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(pF)
V18MA1A	18A	9	13	0.06	40	14	18	23	49	550
V18MA1B	18B	10	14	0.07	40	15	18	21	44	550
V18MA1S	18S	10	14	0.06	40	15	18	21	49	550
V22MA1A	22A	10	15	0.09	40	16	22	28	55	410
V22MA1B	22B	14	18	0.10	40	19	22	26	51	410
V22MA1S	22S	14	18	0.09	40	19	22	26	55	410
V27MA1A	27A	13	19	0.10	40	21	27	34	67	370
V27MA1B	27B	17	22	0.11	40	24	27	31	59	370
V27MA1S	27S	17	22	0.10	40	24	27	31	67	370

MA SERIES (Continued)

MODEL NUMBER	DEVICE MARKING	MAXIMUM RATINGS (85°C)				SPECIFICATIONS (25°C)				
		CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLT AT I_P VALUE CURRENT (8/20μs)	TYPICAL CAPACITANCE
		V_{RMS}	V_{DC}	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)	MIN	$V_{N(DC)}$	MAX	I_P = 2.0A	f = 1MHz
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}					
		(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(pF)
V33MA1A	33A	18	23	0.13	40	26	33	40	73	300
V33MA1B	33B	20	26	0.15	40	29.5	33	36.5	67	300
V33MA1S	33S	20	26	0.14	40	29.5	33	36.5	73	300
V39MA2A	39A	22	28	0.16	40	31	39	47	86	250
V39MA2B	39B	25	31	0.18	40	35	39	43	79	250
V39MA2S	39S	25	31	0.17	40	35	39	43	86	250
V47MA2A	47A	27	34	0.19	40	37	47	57	99	210
V47MA2B	47B	30	38	0.21	40	42	47	52	90	210
V47MA2S	47S	30	38	0.19	40	42	47	52	99	210
V56MA2A	56A	32	40	0.23	40	44	56	68	117	180
V56MA2B	56B	35	45	0.25	40	50	56	62	108	180
V56MA2S	56S	35	45	0.23	40	50	56	62	117	180
V68MA3A	68A	38	48	0.26	40	54	68	82	138	150
V68MA3B	68B	40	56	0.30	40	61	68	75	127	150
V68MA3S	68S	40	56	0.27	40	61	68	75	138	150
V82MA3A	82A	45	60	0.33	40	65	82	99	163	120
V82MA3B	82B	50	66	0.37	40	73	82	91	150	120
V82MA3S	82S	50	66	0.34	40	73	82	91	163	120
V100MA4A	100	57	72	0.40	40	80	100	120	200	100
V100MA4B	101	60	81	0.45	40	90	100	110	185	100
V100MA4S	102	60	81	0.42	40	90	100	110	200	100
V120MA1A	120	72	97	0.40	100	102	120	138	220	40
V120MA2B	121	75	101	0.50	100	108	120	132	205	40
V120MA2S	122	75	101	0.46	100	108	120	132	220	40
V150MA1A	150	88	121	0.50	100	127	150	173	255	32
V150MA2B	151	92	127	0.60	100	135	150	165	240	32
V180MA1A	180	105	144	0.60	100	153	180	207	310	27
V180MA3B	181	110	152	0.70	100	162	180	198	290	27
V220MA2A	220	132	181	0.80	100	187	220	253	380	21
V220MA4B	221	138	191	0.90	100	198	220	242	360	21
V270MA2A	270	163	224	0.90	100	229	270	311	460	17
V270MA4B	271	171	235	1.00	100	243	270	297	440	17
V330MA2A	330	188	257	1.00	100	280	330	380	570	14
V330MA5B	331	200	274	1.10	100	297	330	363	540	14
V390MA3A	390	234	322	1.20	100	331	390	449	670	12
V390MA6B	391	242	334	1.30	100	351	390	429	640	12
V430MA3A	430	253	349	1.50	100	365	430	495	740	11
V430MA7B	431	264	365	1.70	100	387	430	473	700	11

NOTE:

1. Average power dissipation of transients not to exceed 200mW.

PA SERIES

Series PA Varistors are listed under UL file No. E75961 and under CSA file No. LR91788, as a recognized component.

MODEL NUMBER	MAXIMUM RATINGS (85°C)				SPECIFICATIONS (25°C)					
	CONTINUOUS		TRANSIENT							
	V_{RMS}	V_{DC}	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)	VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLT V_C AT TEST CURRENT (8/20μs)		TYPICAL CAPACITANCE
	$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	I_P	f = 1MHz
	(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(A)	(pF)
V130PA20A	130	175	70	6500	184	200	243	360	100	1900
V130PA20C	130	175	70	6500	184	200	220	325	100	1900
V150PA20A	150	200	80	6500	212	240	284	420	100	1600
V150PA20C	150	200	80	6500	212	240	243	360	100	1600
V250PA40A	250	330	130	6500	354	390	453	675	100	1000
V250PA40C	250	330	130	6500	354	390	413	620	100	1000
V275PA40A	275	369	140	6500	389	430	494	740	100	900
V275PA40C	275	369	140	6500	389	430	453	680	100	900
V320PA40A	320	420	160	6500	462	510	565	850	100	750
V320PA40C	320	420	160	6500	462	510	540	800	100	750
V420PA40A	420	560	170	6500	610	680	790	1160	100	600
V420PA40C	420	560	170	6500	610	680	690	1050	100	600
V480PA80A	480	640	180	6500	670	750	860	1280	100	550
V480PA80C	480	640	180	6500	670	750	790	1160	100	550
V510PA80A	510	675	190	6500	735	820	963	1410	100	500
V510PA80C	510	675	190	6500	735	820	860	1280	100	500
V575PA80A	575	730	220	6500	805	910	1050	1560	100	450
V575PA80C	575	730	220	6500	805	910	960	1410	100	450
V660PA100A	660	850	250	6500	940	1050	1210	1820	100	400
V660PA100C	660	850	250	6500	940	1050	1100	1650	100	400

NOTE:

1. Average power dissipation of transients not to exceed 1W.

CA SERIES

MODEL NUMBER	SIZE	MAXIMUM RATINGS (85°C)				SPECIFICATIONS (25°C)				
		CONTINUOUS		TRANSIENT						
		V_{RMS}	V_{DC}	ENERGY (2ms)	PEAK CURRENT (8/20μs)	VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLT V_C AT 200A CURRENT (8/20μs)	TYPICAL CAPACITANCE
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	f = 1MHz
	(mm)	(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(pF)
V131CA32	32	130	175	200	20000	184	200	228	350	4700
V131CA40	40			270	30000				345	10000
V151CA32	32	150	200	220	20000	212	240	268	410	4000
V151CA40	40			300	30000				405	8000

CA SERIES (Continued)

MODEL NUMBER	SIZE	MAXIMUM RATINGS (85°C)				SPECIFICATIONS (25°C)				
		CONTINUOUS		TRANSIENT						
		V_{RMS}	V_{DC}	ENERGY (2ms)	PEAK CURRENT (8/20μs)	VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLT V_C AT 200A CURRENT (8/20μs)	TYPICAL CAPACI-TANCE
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	f = 1MHz
	(mm)	(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(pF)
V251CA32	32	250	330	330	20000	354	390	429	680	2500
V251CA40	40			370	30000				650	5000
V251CA60	60			880	50000				620	10000
V271CA32	32	275	369	360	20000	389	430	473	750	2200
V271CA40	40			400	30000				730	4500
V271CA60	60			950	50000				680	9000
V321CA32	32	320	420	390	20000	462	510	539	850	1900
V321CA40	40			460	30000				830	3800
V321CA60	60			1100	50000				760	7500
V421CA32	32	420	560	400	25000	610	680	748	1200	1500
V421CA40	40			600	40000				1130	3000
V421CA60	60			1500	70000				1060	6000
V481CA32	32	480	640	450	25000	670	750	825	1300	1300
V481CA40	40			650	40000				1240	2700
V481CA60	60			1600	70000				1160	5500
V511CA32	32	510	675	500	25000	735	820	910	1440	1200
V511CA40	40			700	40000				1350	2500
V511CA60	60			1800	70000				1300	5000
V571CA32	32	575	730	550	25000	805	910	1000	1600	1100
V571CA40	40			770	40000				1480	2200
V571CA60	60			2100	70000				1420	4500
V661CA32	32	660	850	600	25000	940	1050	1160	1820	1000
V661CA40	40			900	40000				1720	2000
V661CA60	60			2300	70000				1640	4000
V751CA32	32	750	970	700	25000	1080	1200	1320	2050	800
V751CA40	40			1050	40000				2000	1800
V751CA60	60			2600	70000				1880	3500
V881CA60	60	880	1150	3200	70000	1290	1500	1650	2340	2700
V112CA60	60	1100	1400	3200	70000	1620	1800	2060	2940	2200
V142CA60	60	1400	1750	5000	70000	2020	2200	2550	3600	1800
V172CA60	60	1700	2150	6000	70000	2500	2700	3030	4300	1500
V202CA60	60	2000	2500	7500	70000	2970	3300	3630	5200	1200
V242CA60	60	2400	3000	8600	70000	3510	3900	4290	6200	1000
V282CA60	60	2800	3500	10000	70000	4230	4700	5170	7400	800

NOTE:

1. Average power dissipation of transients not exceed 1.5W, 2.0W and 2.5W for model 32mm, 40mm and 60mm, respectively.

DA/DB SERIES

Series DA and DB Varistors are listed under UL file No. E75961 as a recognized component.

MODEL NUMBER		MAXIMUM RATINGS (85°C)				SPECIFICATIONS (25°C)				
		CONTINUOUS		TRANSIENT						
		V_{RMS}	V_{DC}	ENERGY (2ms)	PEAK CURRENT (8/20μs)	VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLT V_C AT 200A CURRENT (8/20μs)	TYPICAL CAPACI-TANCE
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	f = 1MHz
DA	DB	(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(pF)
V131DA40	V131DB40	130	175	270	30000	184	200	228	345	10000
V151DA40	V151DB40	150	200	300	30000	212	240	268	405	8000
V251DA40	V251DB40	250	330	370	30000	354	390	429	650	5000
V271DA40	V271DB40	275	369	400	30000	389	430	473	730	4500
V321DA40	V321DB40	320	420	460	30000	462	510	539	830	3800
V421DA40	V421DB40	420	560	600	40000	610	680	748	1130	3000
V481DA40	V481DB40	480	640	650	40000	670	750	825	1240	2700
V511DA40	V511DB40	510	675	700	40000	735	820	910	1350	2500
V571DA40	V571DB40	575	730	770	40000	805	910	1000	1480	2200
V661DA40	V661DB40	660	850	900	40000	940	1050	1160	1720	2000
V751DA40	V751DB40	750	970	1050	40000	1080	1200	1320	2000	1800

NOTE:

1. Average power dissipation of transients not to exceed 2.0W.

HA SERIES

HA Series varistors are listed under CSA File No. LR91788 as a recognized component.

HA Series varistors are listed under UL File No. E75961 as a recognized component.

MODEL NUMBER	MAXIMUM RATINGS (85°C)				SPECIFICATIONS (25°C)				
	CONTINUOUS		TRANSIENT						
	V_{RMS}	V_{DC}	ENERGY (2ms)	PEAK CURRENT (8/20μs)	VARISTOR VOLTAGE AT 1 mA DC TEST CURRENT			MAXIMUM CLAMPING VOLTAGE (V_C) AT 200A (8/20μs)	TYPICAL CAPACITANCE AT f = 1MHz
	$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	C
	(V)	(V)	ENERGY	(A)	(V)	(V)	(V)	(V)	(pF)
V131HA32	130	175	200	25000	184	200	228	350	4700
V131HA40	130	175	270	30000	184	200	228	345	10000
V151HA32	150	200	220	25000	212	240	268	410	4000
V151HA40	150	200	300	30000	212	240	268	405	8000
V251HA32	250	330	330	25000	354	390	429	650	2500
V251HA40	250	330	370	40000	354	390	429	630	5000
V271HA32	275	369	360	25000	389	430	473	710	2200
V271HA40	275	369	400	40000	389	430	473	690	4500
V321HA32	320	420	390	25000	462	510	539	845	1900
V321HA40	320	420	460	40000	462	510	539	825	3800
V421HA32	420	560	400	25000	610	680	748	1120	1500
V421HA40	420	560	600	40000	610	680	748	1100	3000

HA SERIES (Continued)

HA Series varistors are listed under CSA File No. LR91788 as a recognized component.

HA Series varistors are listed under UL File No. E75961 as a recognized component.

MODEL NUMBER	MAXIMUM RATINGS (85°C)				SPECIFICATIONS (25°C)				
	CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1 mA DC TEST CURRENT			MAXIMUM CLAMPING VOLTAGE (V_C) AT 200A (8/20μs)	TYPICAL CAPACITANCE AT f = 1MHz
	V_{RMS}	V_{DC}	ENERGY (2ms)	PEAK CURRENT (8/20μs)					
	$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	C
	(V)	(V)	ENERGY	(A)	(V)	(V)	(V)	(V)	(pF)
V481HA32	480	640	450	25000	670	750	825	1290	1300
V481HA40	480	640	650	40000	670	750	825	1230	2700
V511HA32	510	675	500	25000	735	820	910	1355	1200
V511HA40	510	675	700	40000	735	820	910	1295	2500
V571HA32	575	730	550	25000	805	910	1000	1570	1100
V571HA40	575	730	770	40000	805	910	1000	1480	2200
V661HA32	660	850	600	25000	940	1050	1160	1820	1000
V661HA40	660	850	900	40000	940	1050	1160	1720	2000
V751HA32	750	970	700	25000	1080	1200	1320	2050	800
V751HA40	750	970	1050	40000	1080	1200	1320	2000	1800

NA SERIES

MODEL NUMBER	SIZE	MAXIMUM RATINGS (85°C)				SPECIFICATIONS (25°C)				
		CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1 mA DC TEST CURRENT			MAXIMUM CLAMPING VOLTAGE (Vc) AT 200A (8/20μs)	TYPICAL CAPACI-TANCE
		V_{RMS}	V_{DC}	ENERGY (2ms)	PEAK CURRENT (8/20μs)					
		$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	f = 1MHz
	(mm)	(V)	(V)	(V)	(A)	(V)	(V)	(V)	(V)	(pF)
V131NA34	34	130	175	270	30,000	184	200	228	345	10,000
V151NA34	34	150	200	300	30,000	212	240	268	405	8,000
V251NA34	34	250	330	370	40,000	354	390	429	650	5,000
V271NA34	34	275	369	400	40,000	389	430	473	730	4,500
V321NA34	34	320	420	460	40,000	462	510	539	830	3,800
V421NA34	34	420	560	600	40,000	610	680	748	1,130	3,000
V481NA34	34	480	640	650	40,000	670	750	825	1,240	2,700
V511NA34	34	510	675	700	40,000	735	820	910	1,350	2,500
V571NA34	34	575	730	770	40,000	805	910	1000	1,480	2,200
V661NA34	34	660	850	900	40,000	940	1050	1160	1,720	2,000
V751NA34	34	750	970	1050	40,000	1080	1200	1320	2,000	1,800

NOTE:

1. Average power dissipation of transients not to exceed 2.0W.

BA/BB SERIES

Series BA and BB Varistors are listed under UL file No. E75961 as a recognized component.

MODEL NUMBER	MAXIMUM RATINGS (85°C)				CHARACTERISTICS (25°C)				
	CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE AT 1mA DC TEST CURRENT			MAX CLAMPING VOLT V_C AT 200A CURRENT (8/20μs)	TYPICAL CAPACITANCE
	V_{RMS}	V_{DC}	ENERGY (2ms)	PEAK CURRENT (8/20μs)	MIN	$V_{N(DC)}$	MAX	V_C	f = 1MHz
	$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}					
	(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(pF)
V131BA60	130	175	450	50000	184	200	228	340	20000
V151BA60	150	200	530	50000	212	240	268	400	16000
V251BA60	250	330	880	50000	354	390	429	620	10000
V271BA60	275	369	950	50000	389	430	473	680	9000
V321BA60	320	420	1100	50000	462	510	539	760	7500
V421BA60	420	560	1500	70000	610	680	748	1060	6000
V481BA60	480	640	1600	70000	670	750	825	1160	5500
V511BA60	510	675	1800	70000	735	820	910	1300	5000
V571BA60	575	730	2100	70000	805	910	1000	1420	4500
V661BA60	660	850	2300	70000	940	1050	1160	1640	4000
V751BA60	750	970	2600	70000	1080	1200	1320	1880	3500
V881BA60	880	1150	3200	70000	1290	1500	1650	2340	2700
V112BB60	1100	1400	3800	70000	1620	1800	2060	2940	2200
V142BB60	1400	1750	5000	70000	2020	2200	2550	3600	1800
V172BB60	1700	2150	6000	70000	2500	2700	3030	4300	1500
V202BB60	2000	2500	7500	70000	2970	3300	3630	5200	1200
V242BB60	2400	3000	8600	70000	3510	3900	4290	6200	1000
V282BB60	2800	3500	10000	70000	4230	4700	5170	7400	800

NOTE:

1. Average power dissipation of transients not to exceed 2.5W.

AS SERIES

25°C Unless Otherwise Specified

PARAMETER	MODEL NUMBER								UNITS
	V302AS32	V402AS32	V502AS32	V602AS32	V302AS42	V402AS42	V502AS42	V402AS60	
Rated Voltage (RMS)	3.0	4.0	5.0	6.0	3.0	4.0	5.0	4.0	kV
Maximum Continuous Operating Voltage (MCOV)	2.55	3.40	4.25	5.1	2.55	3.40	4.25	3.40	kV
Reference Current, I_{REF}	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	mA
Minimum Reference Voltage, V_{REF}	3.1	4.1	5.1	6.1	3.1	4.1	5.1	4.1	kV_{RMS}

AS SERIES (Continued)

25°C Unless Otherwise Specified

PARAMETER	MODEL NUMBER								UNITS
	V302AS32	V402AS32	V502AS32	V602AS32	V302AS42	V402AS42	V502AS42	V402AS60	
Nominal Discharge Current, I_P (8/20µs)	5.0	5.0	5.0	5.0	10.0	10.0	10.0	10.0	kA
Residual Voltage (max) at I_P	9.8	13.1	16.3	19.6	10.0	13.3	16.7	12.5	kV
Energy Rating at 60°C (2ms)	2.2	2.9	3.6	4.3	3.5	4.7	5.8	12.0	kJ
Peak Current, 4/10µs at 60°C (Note 2)	65.0	65.0	65.0	65.0	100.0	100.0	100.0	100.0	kA
Maximum Steep Current Residual Voltage at 5kA (1/20µs)	11.3	15.0	18.8	22.5	-	-	-	-	kV
Maximum Steep Current Residual Voltage at 10kA (1/20µs)	-	-	-	-	11.5	15.3	19.2	14.4	kV
Maximum Dissipation Power at MCOV	0.23	0.30	0.38	0.45	0.30	0.40	0.60	0.50	W
Maximum Conduction Current at MCOV	75.0	75.0	75.0	75.0	110.0	110.0	110.0	140.0	µA
DIMENSIONS (in millimeters)									
Diameter (ØD)									
Min	32.3	32.3	32.3	32.3	40.9	40.9	40.9	60.0	mm
Max	33.7	33.7	33.7	33.7	42.3	42.3	42.3	62.0	mm
Height (H)									
Typical	21.0	28.0	36.0	42.0	21.0	28.0	36.0	34.0	mm

NOTES:

1. In addition to above standard types, custom ratings and dimensions can be provided.
2. Parts should be wrapped using a secondary insulating film or encased by polymeric housing.

DIGITAL MICRO 11

PRODUCT SELECTION GUIDE

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Digital Micro Ordering Nomenclature

80CXXX, 82CXXX TYPES

M D 80C86 - 2 /B

TEMPERATURE RANGE
C: 0°C to 70°C
I: -40°C to 85°C
M: -55°C to 125°C

SUFFIX
/B: -55°C to 125°C with Burn-In
/883: Current Rev Compliant
/7: Thin EPI, Current Rev 883 Compliant

SPEED DESIGNATION

Peripherals	µProcessors
-5: 5MHz	Blank: 5MHz
Blank: 8MHz	-2: 8MHz
-10: 10MHz	-10: 10MHz
-12: 12MHz	-12: 12MHz
	-20: 20MHz
	-25: 25MHz

PACKAGE DESIGNATOR
P: Dual-In-Line Plastic (PDIP)
D: Ceramic Dual-In-Line Frit-Seal (CERDIP)
or Ceramic Dual-In-Line Metal Seal (SBDIP)
G: Ceramic Pin Grid Array (CPGA)
R: Ceramic Leadless Chip Carrier (CLCC)
S: Plastic Leaded Chip Carrier (PLCC)
M: Small Outline Plastic (SOIC)

PART NUMBER
80CXXX: CMOS Microprocessors
82CXXX: CMOS Peripherals

CDP/CMM/MWS TYPES

CDP1802 A C D 3

PART NUMBER (CMOS LSI)
CDP18XX
CMMXXXX
MWS51XX: RAM

REVISION
A: 1st
B: 2nd

VOLTAGE
C: 5V Device

PRODUCT ASSURANCE LEVEL
X: -40°C to 85°C with Burn-In
3: Non-Compliant with MIL-STD-883

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
E: Dual-In-Line Plastic (PDIP)
K: Ceramic Flatpack
Q or N: Plastic Leaded Chip Carrier (PLCC)

CDP6805 TYPES

CDP6805 E2 E

PART NUMBER (Microprocessor)

FAMILY SERIES
E2, E2C
E3, E3C

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
E: Dual-In-Line Plastic (PDIP)
Q or N: Plastic Leaded Chip Carrier (PLCC)

CDP68HC05C, HCL, HSC TYPES

CDP68HC05 C8B E

PART NUMBER (Microcontroller)
HC: Standard
HCL: Low Power
HSC: High Speed

FAMILY SERIES
C4B, C8B, C16B

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
E: Dual-In-Line Plastic (PDIP)
N: Plastic Leaded Chip Carrier (PLCC)
Q: Metric Plastic Quad Flatpack (MQFP)
SE: Shrink Dual-In-line Plastic (SPDIP)
H: Chip

CDP68HC05J, HCL, HSC TYPES

CDP68HC05 J4B E 20

PART NUMBER (Microcontroller)
HC: Standard
HCL: Low Power
HSC: High Speed

FAMILY SERIES
J3, J4B, P1B, P4B

PACKAGE DESIGNATOR
E: Dual-In-Line Plastic (PDIP)
M: Small Outline Plastic (SOIC)
H: Chip

PIN COUNT
20, 28

CDP68HC68 TYPES

CDP68HC68 T1 M

PART NUMBER (Peripherals)
HC: Standard

FAMILY SERIES
A2, P1, R1, R2, S1, T1, T3, W1

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
E: Dual-In-Line Plastic (PDIP)
M: Small Outline Plastic (SOIC)
H: Chip

CDP65C51 TYPES

CDP65C51 A E 4

PART NUMBER (Peripherals)

FAMILY SERIES
A: Non-Standard Clear to Send (CTS) Operation
Blank: Standard Clear to Send (CTS) Operation

PACKAGE DESIGNATOR
E: Dual-In-Line Plastic (PDIP)
M: Small Outline Plastic (SOIC)
H: Chip
SM: Shrink Small Outline Plastic (SSOP)

SPEED OPTIONS
1: 1MHz Operation
2: 2MHz Operation
4: 4MHz Operation

CDP6XXX TYPES

CDP6XXX E X

PART NUMBER (Peripherals)
CDP6818
CDP64XX

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
H: Chip
E: Dual-In-Line Plastic (PDIP)
M: Small Outline Plastic (SOIC)
Q or N: Plastic Leaded Chip Carrier (PLCC)

SCREENING OPTION
X: Enhanced Product Screening i.e., Burn-In (Optional for D, E Package Types)

HX "OLD" TYPES

H A 1 - 5134 A 2 96

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
D: Digital
I: Interface
M: Memory
V: Analog High Voltage

PACKAGE DESIGNATOR
1: Ceramic Dual-In-Line Frit-Seal (CERDIP)
1B: Ceramic Dual-In-Line Metal-Seal (SBDIP)
2: Can
3: Dual-In-Line Plastic (PDIP)
4: Ceramic Leadless Chip Carriers (CLCC)
4P: Plastic Leaded Chip Carrier (PLCC)
6: Narrow Dual-In-Line Plastic (PDIP) or Ceramic Dual-In-Line Frit-Seal (CERDIP)
7: 8 Lead Ceramic Dual-In-Line Frit-Seal (CERDIP)
9P: Small Outline Plastic (SOIC)
0: Chip

NOTE: If the package designator is 2 characters the hyphen is omitted from the part number.

PART NUMBER

PERFORMANCE GRADE
A, B: High Performance
C: Relaxed Specification
S: Very High Speed

NOTE: Applies to HA, HD and HM products only.

TEMPERATURE GRADE
-2: -55°C to 125°C
-4: -25°C to 85°C
-5: 0°C to 75°C
-6: 25°C Chip Probe
-7: Dash-7 High Reliability Commercial Product 0°C to 75°C, includes 96 hour Burn-In
-8: -55°C to 125°C Harris Class B Equivalent Devices for use in Military and Flight Systems
-9: -40°C to 85°C
/883: Fully Compliant to MIL-STD-883, Class B/QML
BXXXX: Customer Specific Screening
RXXXX: Customer Specific Screening

SUFFIX
96: Tape and Reel Option for SOIC

CA TYPES

CA3260 A T 3

PART NUMBER
CAXXXX

ELECTRICAL OPTIONS
A, B, C, Blank

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
E: Dual-In-Line Plastic (PDIP)
F: Ceramic Dual-In-Line Frit-Seal (CERDIP)
J: Ceramic Leadless Chip Carrier (CLCC)
M: Small Outline Plastic (SOIC)
Q: Plastic Leaded Chip Carrier (PLCC)
S: DIL Formed TO-5
T: Can
Z: Single-In-Line Plastic (SIP)
Blank: Refer to Data Sheet for Package Type

SUFFIX
3: -55°C to 125°C Modified Class B
3W: Modified Class B without High & Low Temperature DC
96: Tape and Reel

NOTE: If the part number contains three digits, add a leading zero when ordering. Example: CA555 becomes CA0555.

ICL, ICM TYPES

ICL 8069D C B A T

DEVICE FAMILY
ICL
ICM

BASIC DEVICE TYPE

TEMPERATURE RANGE
C: Commercial, 0°C to 70°C
I: Industrial, -25°C to 85°C or -40°C to 85°C (Specified on Data Sheet)
M: Military, -55°C to 125°C

PACKAGE DESIGNATOR
B: Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
F: Ceramic Flatpack
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
M: Metric Plastic Quad Flatpack (MQFP)
P: Plastic Dual-In-Line
S: TO-52 Can
T: Can (TO-99, TO-100)
Z: TO-92 (Plastic)
/W: Wafer
/D: Chip

SUFFIX
/883B: Fully Compliant to MIL-STD-883 Class B/QML
T: Tape and Reel

PIN COUNT DESIGNATOR

SUFFIX	PIN COUNT	DIAMETER
A	8	
B	10	
C	12	
D	14	
E	16	
F	22	
G	24	
H	42	
I	28	
J	32	
K	35	
L	40	
N	18	
P	20	
Q	2	
R	3	
V	8	0.200″ pin circle, isolated case
W	10	0.230″ pin circle, isolated case
X	10	0.230″ pin circle, case to pin 5
Y	8	0.200″ pin circle, case to pin 4
Z	8	0.230″ pin circle, case to pin 5
44	44	

COMMUNICATIONS DEVICES

MANCHESTER ENCODERS/DECODERS

HD-6408, HD-6409, HD-15530, HD-15531
CMOS MANCHESTER ENCODER/DECODER

Document # 2952 (HD-6408), 2951 (HD-6409), 2960 (HD-15530), 2961 (HD-15531)

Manchester (Bi-Phase) encoding and decoding of a serial data stream intended to service the requirements of MIL-STD-1553 and similar Manchester II self clocking, encoded, time division multiplexed serial data protocols.

- Independent Encoder and Decoder
- No DC Component Allowing Transformer Coupling
- High Noise Immunity
- Complete Clock Recovery and Phase Lock-in
- Encoder Converts NRZ Data to Manchester II Data Adding a Command or Data Synchronous Pulse and Parity (6408, 15530, 15531)
- Encoder Converts NRZ Data to Manchester II Data Adding Eight Manchester Zeroes and a Command Synchronous Pulse (6409)
- Decoder Recognizes Synchronous Pulse as a Command or Data Synchronous, Decodes the Data into NRZ, Checks for Parity (Except 6409), and Checks for Manchester Errors
- On-Chip Oscillator (6409 Only)
- Repeater Mode Reconstructs Manchester Code Input with a Recovered Clock (6409 Only)
- Applications
  - Military Aircraft Data Bus Standard
  - Telemetry Systems
  - Magnetic Tape Recording
  - Fiber Optic Communications
  - Security Systems
  - High Speed Modems

PART NUMBER	PIN CONFIGURATION	DATA FRAME LENGTH	DATA RATE	TEMPERATURE RANGE
HD-6408	24 Lead	16 Bits	1.0M Bit/s	-40°C to 85°C
HD-15530	24 Lead	16 Bits	1.25M Bit/s	-40°C to 85°C -55°C to 125°C
HD-15531	40 Lead	2-32 Bits	1.25M Bit/s	-40°C to 85°C -55°C to 125°C
HD-15531B	40 Lead	2-32 Bits	2.5M Bit/s	-40°C to 85°C -55°C to 125°C
HD-6409	20 Lead	Complete Variable	1.0M Bit/s	-40°C to 85°C -55°C to 125°C

ARINC INTERFACE

HS-3282
CMOS ARINC BUS INTERFACE CIRCUIT

Document # 2964

- Data Rates Up to 100K Bits/s
- Dual and Independent Receivers, Connecting Directly to ARINC Bus
- Separate Receiver and Transmitter Sections
- 16-Bit Parallel Data Bus
- 32-Bit or 25-Bit Serial Word Length
- FIFO Holds Up to 8 ARINC Data Words for Transmission
- Single 5V Supply
- 40 Lead CERDIP and 44 pad Ceramic LCC
- Full Military Temperature Range

HS-3182
ARINC 429 BUS INTERFACE LINE DRIVER CIRCUIT

Document # 2963

- TTL and CMOS Compatible Inputs
- Adjustable Rise and Fall Times Via Two External Capacitors
- Programmable Output Differential Voltage Via V_{REF} Input
- Operates at Data Rates Up to 100K Bits/s
- Output Short Circuit Proof and Contains Over-Voltage
- Protection
- Outputs are Inhibited (0V) If DATA (A) and DATA (B) Inputs are Both in the "Logic One" State
- DATA (A) and DATA (B) Signals are "AND'd" with Clock and Sync Signals
- Full Military Temperature Range

MEMORY

MEMORIES RAMs AND PROMs

- RAMs
  - Densities. 1K-64K
  - Commercial - /883-DESC-JAN
  - Low Power CMOS
  - Six Transistor Arrays
- PROMs
  - 512 x 8, 2K x 8

MICROCOMPUTER

CDP-1800 8-BIT MICROCOMPUTER FAMILY

- 7μ
- Fully Static Low Power CMOS
- Six Transistor RAM
- 16 x 16 Register Array for Use as Program Counters, Data Pointers, or Data Registers
- On Chip DMA, Interrupt, and Flag Inputs Directly Tested by Branch Instructions
- One Output and Four Input Bits
- Single-Phase Clock; Optional On-Chip Crystal-Controlled Oscillator
- Flexible Programmed I/O Mode
- Programmable Single-Bit Output Port
- Static Circuitry - No Minimum Clock Frequency
- 8-Bit Parallel Organization with Bidirectional Data Bus and Multiplexed Address Bus

CDP1800 SERIES SPECIFICATIONS

TYPE	MEMORY ADD (BYTES)	ON-CHIP RAM (BYTES)	ON-CHIP ROM (BYTES)	MAX CLK FREQ (MHz)	INSTRUC TIME MIN/MAX (μs)	TIMER/COUNTER BITS	PRESCALERS	BUS STRUCTURE	INTERRUPTS	LATCH I/O	MAX OPERATING TEMP (°C)	PACKAGE NUMBER OF LEADS	INSTRUCTIONS	ADDITIONAL FEATURES
CDP1802A CDP1802AC	64K	-	-	3.2	5.0/7.5	-	-	MUX Address Lines	X	Off-Chip	-55 to 125	40D 40E 44Q	91	
CDP1802BC	64K	-	-	5.0	3.2/4.8	-	-	MUX Address Lines	X	Off-Chip	-55 to 125	40D 40E 44Q	91	
CDP1805AC	64K	64	-	5.0	3.2/16.5	8	÷32	MUX Address Lines	X	Off-Chip	-55 to 125	40D 40E 44Q	123 Includes Call/Return	8-Bit Timer/ Counter
CDP1806AC	64K	-	-	5.0	3.2/16.0	8	÷32	MUX Address Lines	X	Off-Chip	-55 to 125	40D 40E 44Q	123 Includes Call/Return	8-Bit Timer/ Counter

MANCHESTER ENCODERS/DECODERS

CDP1871A, CDP1871AC
CMOS KEYBOARD ENCODER

Document # 1374

- Directly Interfaces with CDP1800-Series Microprocessor
- Low Power Dissipation
- Three-State Outputs
- Scans and Generates Code for 53 Key ASCII Keyboard Plus 32 HEX Keys (SPST Mechanical Contact Switches)
- Shift, Control, and Alpha Lock Input
- RC-Controlled Debounce Circuitry
- Single Supply 4V to 10.5V . . . . . (CDP1871A)
  4V to 6.5V . . . . . (CDP1871AC)
- N-Key Lockout

BUS CONTROLLERS

CDP1877, CDP1877C
PROGRAMMABLE INTERRUPT CONTROLLER (PIC)

Document # 1319

- Compatible with CDP1800 Series
- Programmable Long Branch Vector Address and Vector Interval
- 8 Levels of Interrupt Per Chip
- Easily Expandable
- Latched Interrupt Requests
- Hard Wired Interrupt Priorities
- Memory Mapped
- Multiple Chip Select Inputs to Minimize Address Space Requirements

BUS DRIVERS/LATCHES

CDP1853, CDP1853C
N-BIT 1 OF 8 DECODER

Document # 1189

- Provides Direct Control of Up to 7 Input and 7 Output Devices
- Operation . . . . . .4V to 10.5V
- Prop Delay 1.6mA Drive/200ns
- CHIP ENABLE (CE) Allows Easy Expansion for Multi-level I/O Systems

CDP1881, CDP1881C, CDP1882, CDP1882C
CMOS 6-BIT LATCH AND DECODER MEMORY INTERFACES

Document # 1367

- Performs Memory Address Latch and Decoder Functions Multiplexed or Non-Multiplexed
- Decodes Up to 16K Bytes of Memory
- Interfaces Directly with CDP1800-Series Microprocessors at Maximum Clock Frequency
- Can Replace CDP1866 and CDP1867 (Upward Speed and Function Capability)

MICROCONTROLLERS

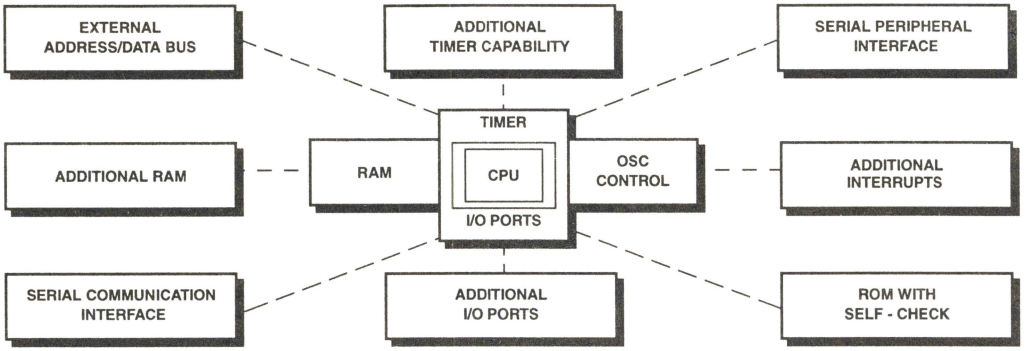
68HC05 8-BIT MICROCONTROLLER FAMILY

- Hardware
  - 8-Bit Architecture
  - Fully Static Operation
  - Self-Check Mode
  - Master Reset and Power-On Reset
  - Single 3V to 6V Power Supply
  - Power Saving Stop and Wait Modesf
- Software
  - Software Compatible with Entire 68HC05 Family
  - 61 Instructions and 10 Addressing Modes
  - Indexed Addressing for Tables
  - True Bit Manipulation
  - Memory Mapped I/O
  - Efficient Use of Program Space
  - Versatile Interrupt Handling
- 8 x 8 Multiple Instruction in C4, C8 and D2 Versions

6805	68HC05	68HSC05	68HCL05
• 3µ • 4MHz	• 1.2µ • 4MHz • 6 Transistor RAM Cells	• 1.2µ • 8MHz • 6 Transistor RAM Cells	• 1.2µ • Low Power Version • 6 Transistor RAM Cells

6805/68HC05 MICROCONTROLLER FAMILY

All members of the 6805 family are designed around a common core which consists of CPU, timer, oscillator, control, bidirectional I/O, RAM and ROM. This common core is expanded to provide versions of the 6805 with additional memory, I/O lines, interrupt capability, timer counters, and serial interfaces.



CDP6805 CMOS FAMILY CORE ARCHITECTURE BLOCK DIAGRAM

HARRIS 68HC05 QUICK REFERENCE

PART NUMBER	RAM BYTES	ROM BYTES	EXTERNAL ADDRESS SPACE	I/O LINES	FEATURES	ADDITIONAL FEATURES
CDP6805E2/E2C	112	-	8K	16	8-Bit Timer	• 8-Bit and 16-Bit Timers with Prescalers • UART • Serial Peripheral Interface (SPI) Provides Interface to Expanded Off Chip I/O • Keyboard Interfaces • Pulse Width Modulators • Watch Dog Timer • J1850 • COP • Keyboard Interrupts • High Current Drive Pin
CDP6805E3/E3C	112	-	64K	13	8-Bit Timer	
CDP68HC/HCL/HSC05C4	176	4160	-	24	16-Bit Timer, SCI, SPI	
CDP68HC/HCL/HSC05C8	176	7744	-	24	16-Bit Timer, SCI, SPI	
CDP68HC05J3	128	2352	-	12	16-Bit Timer	
CDP68HC05J4B	176	4160	-	14	16-Bit Timer	
HIP7030A2	176	2352	-	13	16-Bit Timer, SPI, J1850, Watchdog	
HIP7030A4	176	4160	-	13	16-Bit Timer, SPI, J1850, Watchdog	
CDP68HC/HCL/HSC05C4B	176	4160	-	24	16-Bit Timer, SCI, SPI	
CDP68HC/HCL/HSC05C8B	176	7744	-	24	16-Bit Timer, SCI, SPI	
CDP68HC/HCL/HSC05C16B	352	15,936	-	31	16-Bit Timer, SCI, SPI	
CDP68HC/HCL/HSC05P4B	176	4160	-	20	16-Bit Timer, SIOP	

SPI BUS PERIPHERALS

CA3282
CMOS OCTAL SERIAL SOLENOID DRIVER

Document # 2767

- Output Current Drive Capability
  - All Outputs ON, Equal . . . . . .0.625A Each
  - Per Output Individually . . . . . 1A Each
  - Maximum Total of Outputs ON 5A
- High Voltage Power BiMOS Outputs
  - 8 Open Drain NDMOS Drivers
  - Individual Output Latch
  - Over-Current Limit Protection 1.05A
  - Over-Voltage Clamp Protection 30V

CDP68HC68A2
CMOS SERIAL 10-BIT A/D CONVERTER

Document # 1963

- Interfaces External Analog Signals to 6805-Series µP Via 4-Wire SPI Serial Bus
- 10-Bit Switched Capacitor, Successive Approximation A/D
- 14µs 10-Bit Conversion Time
- 8 Multiplexed Analog Input Channels
- Intrinsic Sample and Hold

CDP68HC68R1, CDP68HC68R2
CMOS 128 AND 256 WORD BY 8-BIT STATIC RAMs

Document # 1544

- Fully Static Operation
- Operating Voltage Range. . . . . .3V to 5.5V
- Typical Standby Current. 1µA
- Directly Compatible with Harris/Motorola SPI Bus
- Separate Data Input and Three-State Data Output Pins
- Input Data and Clock Buffers Gated Off with Chip Enable
- Automatic Sequencing for Fast Multiple Byte Accesses
- Low Minimum Data Retention Voltage. 2V
- Wide Operating Temperature Range . . . . . -40°C to 85°C

CDP68HC68S1
MULTIPLEXED BUS INTERFACE

Document # 1918

- Differential Bus for Minimal EMI
- High Common Mode Noise Rejection
- Ideal for Twisted Pair Wiring
- Data Collision/Idle Detection
- Bus Arbitration
- Programmable Clock Divider
- Power-On Reset

CDP68HC68P1
CMOS SINGLE PORT INPUT/OUTPUT

Document # 1858

- Fully Static Operation
- Operating Voltage Range 3V to 6V
- Compatible with Harris/Motorola SPI Bus
- 2 External Address Pins Tied to V_{DD} or V_{SS} to Allow Up to 4 Devices to Share the Same Chip Enable
- Versatile Bit-Set and Bit-Clear Capability
- Accepts Either SCK Clock Polarity - SCK Voltage Level is Latched When Chip Enable Goes Active
- All Inputs are Schmitt-Trigger
- 8-Bit I/O Port - Each Bit can be Individually Programmed as an Input or Output via an 8-Bit Data Direction Register
- Programmable On Board Comparator
- Simultaneous Transfer of Compare Information to CPU During Read or Write - Separate Access Not Required

CDP68HC68T1 - CMOS REAL-TIME CLOCK
WITH RAM AND POWER SENSE/CONTROL

Document # 1547

- SPI - Serial Peripheral Interface
- Full Clock Features
  - Seconds, Minutes, Hours, (12/24, AM/FM), Day of Week, Date, Month, Year, (0-99), Automatic Leap Year
- 32 Word x 8-Bit RAM
- Seconds, Minutes, Hours Alarm
- Automatic Power Loss Detection
- Minimum Standby (Timekeeping) Voltages. 2.2V
- Selectable Crystal or 50/60Hz Line Input
- Buffered Clock Output
- Battery Input Pin that Powers Oscillator and Also Connects to the V_{DD} Pin when Main Power Fails
- Three Independent Interrupt Modes
  - Alarm
  - Periodic
  - Power-Down Sense

HIP7010
J1850 BUS INTERFACE

- SAE J1850 VPW Compliant
- Supports Non-destructive Bus Arbitration
- Extensive Error Detection
- Directly Interfaces to HIP7020 J1850 Bus Transceiver
- 4X Mode
- Programmable Clock Divider

CDP68HC68W1
DIGITAL PULSE-WIDTH MODULATOR

- Programmable Frequency and Duty-Cycle Output
- Serial Bus Input; Compatible with Motorola/Harris SPI Bus, Simple Shift-Register Type Interface
- 8 Lead PDIP Package
- Shmitt Trigger Clock Input . . . . . .8MHz Frequency
- Operation . . . . . 4V to 6V
- Temperature Range . . . . . -40°C to 85°C

MICROPROCESSOR

80C86, 80C88, 80C286 MICROPROCESSORS FAMILY

- Pin and Function - Compatible with NMOS Equivalents
- Fully Static CMOS Designs
- Bus Hold Devices Eliminate the Need for Pull Up Resistors On Bus and Control Lines
- Available in /883 Compliant Versions

80C86	80C88	80C286
• 5MHz and 8MHz Commercial • 5MHz and 8MHz Military	• 5MHz and 8MHz Commercial • 5MHz and 8MHz Military	• 12.5MHz, 16MHz, 20MHz, and 25MHz Commercial • 10MHz and 12.5MHz Military

STATIC MICROPROCESSORS

80C286

- Compatible with NMOS 80286
- Static CMOS Design for Low Power Operation
  - ICCSB . . . . . 5mA Max
  - ICCOP . . . . . .220mA Max (80C286-12)
- High Performance Processor (Up to 19 Times the Throughput 8086)
- Large Address Space
  - 16M Bytes Physical
  - 1G Byte Virtual per Task
- Integrated Memory Management, Four-Level Memory Protection and Support for Virtual Memory and Operating Systems
- Two 80C286 Real Address Mode
  - 80C286 Real Address Mode
  - Protected Virtual Address Mode
- Compatible with 80287 Numberic Data Co-Processor
- Wide Range of Clock Rates
  - DC to 25MHz (80C286-25)
  - DC to 20MHz (80C286-20)
  - DC to 16MHz (80C286-16)
  - DC to 12.5MHz (80C286-12)
  - DC to 10MHz (80C286-10)
- High Bandwidth Bus Interface (25M Byte/s)
- Available in a 68 Lead PGA and PLCC

80C86

- Compatible with NMOS 8086
- Completely Static CMOS Design
  - DC to 5MHz (80C86), DC to 8MHz (80C86-2)
- Low Power Operation
  - ICCSB . . . . . 500µA Max
  - ICCOP . . . . . 10mA/MHz (Typ)
- 1M Byte of Direct Memory Addressing Capability
- 24 Operand Addressing Modes
- Bit, Byte, Work and Block Move Operations
- 8-Bit and 16-Bit Signed/Unsigned Arithmetic
- Bus Hold Circuitry Eliminates Pull-Up Resistors
- Available in 40 Lead DIP and 40 Lead PLCC/LCC

80C88

- Compatible with NMOS 8088
- Direct Software Compatibility with 80C86, 8086, 8088
- 8-Bit Data Bus Interface: 16-Bit Internal Architecture
- Completely Static CMOS Design
  - DC to 5MHz (80C86), DC to 8MHz (80C86-2)
- Low Power Operation
  - ICCSB . . . . . 500µA Max
  - ICCOP . . . . . 10mA/MHz (Typ)
- 1M Byte of Direct Memory Addressing Capability
- 24 Operand Addressing Modes
- Bit, Byte, Work and Block Move Operations
- 8-Bit and 16-Bit Signed/Unsigned Arithmetic
- Bus Hold Circuitry Eliminates Pull-Up Resistors
- Available in 40 Lead DIP and 40 Lead PLCC/LCC

80CXXX PERIPHERALS

82C37A
CMOS HIGH PERFORMANCE PROGRAMMABLE DMA CONTROLLER

Document # 2967

- Compatible with the NMOS 8237A
- Four Independent Maskable Channels with Autoinitialization Capability
- Cascadable to any Number of Channels
- High Speed Data Transfers:
  - Up to 4MBytes/sec with 8MHz Clock
  - Up to 6.25MBytes/sec with 12.5MHz Clock
- Memory-to-Memory Transfers
- Static CMOS Design Permits Low Power Operation
  - ICCSB = 10μA Maximum
  - ICCOP = 2mA/MHz Maximum
- Fully TTL/CMOS Compatible
- Internal Registers may be Read from Software

82C50A
CMOS ASYNCHRONOUS COMMUNICATIONS ELEMENT

Document # 2958

- Single Chip UART/BRG
- DC to 625K Baud (DC to 10MHz Clock)
- Crystal or External Clock Input
- On Chip Baud Rate Generator 1 to 65535 Divisor Generates 16X Clock
- Prioritized Interrupt Mode
- Fully TTL/CMOS Compatible
- Microprocessor Bus Oriented Interface
- 80C86/80C88 Compatible
- Scaled SAJI IV CMOS Process
- Low Power - 1mA/MHz Typical
- Modem Interface
- Line Break Generation and Detection
- Loopback and Echo Modes
- Doubled Buffered Transmitter and Receiver
- Single 5V Supply

82C52
CMOS SERIAL CONTROLLER INTERFACE

Document # 2950

- Single Chip UART/BRG
- DC to 16MHz (1M Baud) Operation
- Crystal or External Clock Input
- On-Chip Baud Rate Generator - 72 Selectable Baud Rates
- Interrupt Mode with Mask Capability
- Microprocessor Bus Oriented Interface
- 80C86 Compatible
- Single +5V Power Supply
- Low Power Operation . . . . . 1mA/MHz Typ
- Modem Interface
- Line Break Generation and Detection
- Operating Temperature Range

82C54
CMOS PROGRAMMABLE INTERVAL TIMER

Document # 2970

- 8MHz to 12MHz Clock Input Frequency
- Compatible with NMOS 8254
  - Enhanced Version of NMOS 8253
- Three Independent 16-Bit Counters
- Six Programmable Counter Modes
- Status Read Back Command
- Binary or BCD Counting
- Fully TTL Compatible
- Single 5V Power Supply
- Low Power
  - ICCSB 10μA
  - ICCOP . . . . . 10mA at 8MHz

82C55A
CMOS PROGRAMMABLE PERIPHERAL INTERFACE

Document # 2969

- Pin Compatible with NMOS 8255A
- 24 Programmable I/O Pins
- Fully TTL Compatible
- High Speed, No "Wait State" Operation with 5MHz and 8MHz 80C86 and 80C88
- Direct Bit Set/Reset Capability
- Enhanced Control Word Read Capability
- L7 Process
- 2.5mA Drive Capability on All I/O Ports
  - Low Standby Power (ICCSB) 10µA

82C59A
CMOS PRIORITY INTERRUPT CONTROLLER

Document # 2784

- 12.5MHz, 8MHz and 5MHz Versions Available
- High Speed, "No Wait-State" Operation with 12.5MHz 80C286 and 8MHz 80C86/88
- Pin Compatible with NMOS 8259A
- 80C86/88/286 and 8080/85/86/88/286 Compatible
- Eight-Level Priority Controller, Expandable to 64 Levels
- Programmable Interrupt Modes
- Individual Request Mask Capability
- Fully Static Design
- Fully TTL Compatible
- Low Power Operation
  - ICCSB . . . . . 20µA (Max)
  - ICCOP . . . . . 1mA/MHz (Max)
- Single 5V Power Supply

82C88
CMOS BUS CONTROLLER

Document # 2979

- Compatible with Bipolar 8288
- Performance Compatible with:
  - 80C86/80C88, 8086/8088 . . . . . (5/8MHz)
  - 80186/80188 . . . . . (6/8MHz)
  - 8089
- Provides Advanced Commands for Multi-Master Busses
- Three-State Command Outputs
- Bipolar Drive Capability
- Scaled SAJI IV CMOS Process
- Single 5V Power Supply
- Low Power Operation
  - ICCSB . . . . . 10µA (Max)
  - ICCOP . . . . . 1mA/MHz (Max)

82C89
CMOS BUS ARBITER

Document # 2980

- Pin Compatible with Bipolar 8289
- Performance Compatible with:
  - 80C86/80C88 . . . . . (5/8MHz)
- Provides Multi-Master System Bus Control and Arbitration
- Provides Simple Interface with 82C88/8288 Bus Controller
- Synchronizes 80C86/8086, 80C88/8088 Processors with Multi-Master Bus
- Bipolar Drive Capability
- Four Operating Modes for Flexible System Configuration
- Low Power Operation
  - ICCSB . . . . . 10µA (Max)
  - ICCOP . . . . . 1mA/MHz (Max)

80CXXX CLOCK GENERATORS

82C84A CMOS CLOCK GENERATOR DRIVER

Document # 2974

- Generates the System Clock for CMOS or NMOS Microprocessors
- Up to 25MHz Operation
- Uses a Parallel Mode Crystal Circuit or External Frequency Source
- Provides Ready Synchronization
- Generates System Reset Output from Schmitt Trigger Input
- TTL Compatible Inputs/Outputs
- Very Low Power Consumption
- Single 5V Power Supply
- Operating Temperature Ranges
  - C82C84A . . . . . 0°C to 70°C
  - I82C84A . . . . . -40°C to 85°C
  - M82C84A . . . . . -55°C to 125°C
- Application
  - System/Peripheral Clock Generator

82C284 CLOCK GENERATOR AND READY INTERFACE FOR 80C286 PROCESSORS

Document # 2966

- Generates System Clock for 80C286 Processors
- Generates System Reset Output from Schmitt Trigger Input
- Improved Hysteresis
- Uses Crystal or External Signal for Frequency Source
- Dynamically Switchable between Two Input Frequencies
- Provides Local $\overline{\text{READY}}$ and MULTIBUS™ $\overline{\text{READY}}$ Synchronization
- Static CMOS Technology
- Single +5V Power Supply
- Available in 18 Lead CERDIP Package
- Applications
  - System/Peripheral Clock Generator
  - Multibus Clock Generator/Synchronous

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82C85 CMOS STATIC CLOCK CONTROLLER/GENERATOR

Document # 2976

- Generates the System Clock for CMOS or NMOS Microprocessors and Peripherals
- Complete Control Over System Operation for Very Low System Power
  - Stop-Oscillator
  - Low Frequency
  - Stop-Clock
  - Full Speed Operation
- DC to 25MHz Operation (DC to 8MHz System Clock)
- Generates 50% and 33% Duty Cycle Clocks (Synchronized)
- Uses a Parallel Mode Crystal Circuit or External Frequency Source
- TTL Compatible Inputs/Outputs
- 24 Lead Slimline Dual-In-Line or 28 Pad Square LCC Package Options
- Single 5V Power Supply
- Operating Temperature Range
  - C82C85 . . . . . 0°C to 70°C
  - I82C85 . . . . . -40°C to 85°C
  - M82C85 . . . . . -55°C to 125°C
- Applications
  - System/Peripheral Clock Generator
  - System Power Control

BUS DRIVERS/LATCHES

82C82 - CMOS OCTAL LATCHING BUS DRIVER
82C83H - CMOS OCTAL LATCHING INVERTING BUS DRIVER

Document # 2975(82C82), 2971(82C83H)

- Full 8-Bit Parallel Latching Buffer
- 82C82 is Bipolar 8282 Compatible
- 82C83H Bipolar 8283 Compatible
- Three-State Non-Inverting Outputs
- Gated Inputs:
  - Reduce Operating Power
  - Eliminate the Need for Pull-Up Resistors
- Single 5V Power Supply
- Low Power Operation. . . . . ICCSB = 10μA
- Operating Temperature Ranges
  - C82C82, C82C83H . . . . . 0°C to 70°C
  - I82C82, I82C83H . . . . . -40°C to 85°C
  - M82C82, M82C83H . . . . . -55°C to 125°C

82C86H - CMOS OCTAL BUS TRANSCEIVER
82C87H - CMOS OCTAL INVERTING BUS TRANSCEIVER

Document # 2977(82C86H), 2978(82C87H)

- Full 8-Bit Bi-Directional Bus Interface
- Industry Standard 8286 Compatible Pinout
- High Drive Capability
  - B Side IOL 20mA
  - A Side IOL 12mA
- Three-State Outputs
- Propagation Delay. . . . . .35ns Max
- Gated Inputs
  - Reduce Operating Power
  - Eliminate the Need for Pull-Up Resistors
- Single 5V Power Supply
- Low Power Operation . . . . . .ICCSB = 10μA
- Operating Temperature Ranges
  - C82C86H, C82C87H. . . . . .0°C to 70°C
  - I82C86H, I82C87H . . . . . -40°C to 85°C
  - M82C86H, M82C87H . . . . . -55°C to 125°C

SPECIAL FUNCTION

TIMEBASE GENERATORS

ICM7207, ICM7207A TIMEBASE GENERATOR

Document # 3163

- Oscillator and Frequency Divider Providing 4 Control Outputs for Frequency Counter Timebases
- Low Power Dissipation of <2mW
- Counter Outputs of $\div 2^{12}$, $\div 2^n$, $\div(2^n \times 10)$
- Low Impedance Output Drivers ≤100
- 10MHz, 1PPM/V Frequency Range
- Applications
  - System Timebases
  - Frequency Counters
  - Calibration Generators

ICM7209 TIMEBASE GENERATOR

Document # 3175

- Oscillator Clock Generator with Two Outputs
- Disable Controls for Both Outputs
- 10MHz, 50mW Frequency Range
- 5X TTL Fanout with 10ns Rise/Fall Time
- Applications
  - Oscillator Clock Circuit

ICM7213 ONE SECOND/ONE MINUTE TIMEBASE GENERATOR

Document # 3165

- Guaranteed 2V Operation
- Very Low Current Consumption: Typ 100μA at 3V
- All Outputs TTL Compatible
- On Chip Oscillator Feedback Resistor
- Oscillator Requires Only 3 External Components: Fixed Capacitor, Trim Capacitor, and a Quartz Crystal
- Output Inhibit Function
- 4 Simultaneous Outputs: One Pulse/Sec, One Pulse/Min, 16Hz and Composite 1024 + 16 + 2Hz Outputs
- Test Speed-Up Provides Other Frequency Outputs
- Applications
  - Real Time Clock Generator
  - System Timebase

Microcontroller Selection Tree

EMULATORS

8-BIT MCU EMULATOR

CDP68EM05C4, C8
CMOS High Performance
Silicon Gate
68HC05ICEC1-EV
Emulator Development Board

MICROCONTROLLERS

8-BIT MCU SERIES

CDP68HC05C4
CDP68HCL05C4
CDP68HSC05C4
CDP68HC05C8
CDP68HCL05C8
CDP68HSC05C8
CDP68HC05J3
CDP68HCL05J3
CDP68HSC05J3
CDP68HC05P4B
CDP68HCL05P4B
CDP68HSC05P4B
CDP68HC05C4B
CDP68HCL05C4B
CDP68HSC05C4B
CDP68HC05C8B
CDP68HCL05C8B
CDP68HSC05C8B
CDP68HC05J4B
CDP68HCL05J4B
CDP68HSC05J4B
CDP68HC05C16B
CDP68HCL05C16B
CDP68HSC05C16B

HCMOS MCU

CDP68HC05D2

CMOS 8-BIT MICROPROCESSOR

CDP6805E3, E3C
CDP6805E2, E2C

PERIPHERALS

8-BIT BUS PERIPHERALS

CDP6402, CDP6402C
CMOS Universal Asynchronous Receiver/ Transmitter (UART)
CDP65C51
CMOS Asynchronous Communications Interface Adapter (ACIA)
CDP6818
CMOS Real-Time Clock with RAM
CDP6818A
CMOS Real-Time Clock Plus RAM
CDP6823
CMOS Parallel Interface
CDP6853
CMOS Asynchronous Communications Interface Adapter (ACIA) with Motel Bus
CDP6872
Low Power Crystal Oscillator

SPI SERIAL BUS PERIPHERALS

CDP68HC68A2
CMOS Serial 10-Bit A/D Converter
CDP68HC68P1
CMOS Single Port Input/Output
CDP68HC68R1, CDP68HC68R2
CMOS 128 Word and 256 Word Static RAMS
CDP68HC68S1
Serial Bus Interface
CDP68HC68T1
CMOS Real-Time Clock with RAM and Power Sense/Control
CDP68HC68W1
Digital Pulse Width Modulator

Digital Micro Selection Guide

CMOS STATIC RAMs

PART NUMBER	SIZE	SPEED DESIGNATION	ACCESS TIME	STANDBY CURRENT ICCSB	DATA RETURN CURRENT ICCDR	OPERATING CURRENT ICCOP	PACKAGES
≤ 1K - SYNCHRONOUS							
CDP68HC68R1	128 x 8	Serial	100ns	15µA	1µA	10mA	8 Lead PDIP
CDP68HC68R2	256 x 8	Serial	100ns	50µA	1µA	10mA	8 Lead PDIP
≤ 1K - ASYNCHRONOUS							
CDP1821C	1K x 1	13	255ns	1000µA	200µA	10mA	16 Lead SBDIP
CDP1822	256 x 4	13	450ns	500µA	100µA	8mA	22 Lead PDIP 22 Lead SBDIP
			500ns	1000µA	380µA	10mA	
CDP1823	128 x 8	13	450ns	500µA	100µA	8mA	24 Lead PDIP 24 Lead SBDIP
			505ns	1000µA	400µA	10mA	
CDP1824	32 x 8	13	710ns	200µA	40µA	8mA	18 Lead PDIP 18 Lead SBDIP
			825ns	500µA	40µA	10mA	
CDP1826C	64 x 8		1000ns	50µA	25µA	10mA	22 Lead PDIP
MWS5101, MWS5101A	256 x 4	L2	250ns	50µA	10µA	8mA	22 Lead PDIP 22 Lead SBDIP
		L3	350ns	200µA	50µA	8mA	
1K - SYNCHRONOUS							
HM-6508	1K x 1	B	180ns	10µA	5µA	4mA/MHz	16 Lead PDIP 16 Lead CERDIP
			250ns	10µA	10µA	4mA/MHz	
HM-6518	1K x 1	B	180ns	10µA	5µA	4mA/MHz	18 Lead PDIP 18 Lead CERDIP
			250ns	10µA	10µA	4mA/MHz	
HM-6551	256 x 4	B	220ns	10µA	10µA	4mA/MHz	22 Lead PDIP 22 Lead CERDIP
			300ns	10µA	10µA	4mA/MHz	
HM-6561	256 x 4	B	220ns	10µA	10µA	4mA/MHz	18 Lead PDIP 18 Lead CERDIP
			300ns	10µA	10µA	4mA/MHz	
4K - ASYNCHRONOUS							
MWS5114	1K x 4	3	200ns	100µA	50µA	8mA	18 Lead PDIP 18 Lead SBDIP
		2	250ns	100µA	50µA	8mA	
		1	300ns	250µA	125µA	8mA	
4K - SYNCHRONOUS							
HM-6504	4K x 1	S	120ns	25µA	15µA	7mA/MHz	18 Lead PDIP 18 Lead CERDIP 18 Pad CLCC
		S/883	120ns	50µA	25µA	7mA/MHz	
		B	200ns	25µA	15µA	7mA/MHz	
		B/883	200ns	50µA	25µA	7mA/MHz	
			300ns	25µA	15µA	7mA/MHz	
		/883	300ns	50µA	25µA	7mA/MHz	

CMOS STATIC RAMs (Continued)

PART NUMBER	SIZE	SPEED DESIGNATION	ACCESS TIME	STANDBY CURRENT ICCSB	DATA RETURN CURRENT ICCDR	OPERATING CURRENT ICCOP	PACKAGES
HM-6514	1K x 4	S	120ns	25µA	15µA	7mA/MHz	18 Lead PDIP 18 Lead CERDIP 18 Pad CLCC
		S/883	120ns	50µA	25µA	7mA/MHz	
		B	200ns	25µA	15µA	7mA/MHz	
		B/883	200ns	50µA	25µA	7mA/MHz	
			300ns	25µA	15µA	7mA/MHz	
		/883	300ns	50µA	25µA	7mA/MHz	
16K - ASYNCHRONOUS							
HM-65162	2K x 8	S	55ns	100µA	40µA	70mA	24 Lead CERDIP 32 Pad CLCC
		B	70ns	50µA	20µA	70mA	
			90ns	100µA	40µA	70mA	
		C	90ns	900µA	300µA	70mA	
HM-65262	16K x 1	S	65ns	50µA	20µA	50mA	20 Lead CERDIP 20 Pad CLCC
		B	70ns	50µA	20µA	50mA	
			85ns	50µA	20µA	50mA	
		C	85ns	900µA	400µA	50mA	
16K - SYNCHRONOUS							
HM-6516	2K x 8	B	120ns	50µA	25µA	10mA/MHz	24 Lead CERDIP 32 Pad CLCC
			200ns	100µA	50µA	10mA/MHz	
64K - SYNCHRONOUS							
HM-65642	8K x 8	B	150ns	100µA	75µA	20mA	28 Lead CERDIP 32 Pad CLCC
			150ns	250µA	150µA	20mA	
		C	200ns	400µA	250µA	20mA	

CMOS PROMs

PART NUMBER	SIZE	SPEED DESIGNATION	ACCESS TIME	STANDBY CURRENT ICCSB	DATA RETURN CURRENT ICCDR	OPERATING CURRENT ICCOP	PACKAGES
4K - SYNCHRONOUS - FUSE LINK							
HM-6642	512K x 8	B	120ns	100µA	-	20mA/MHz	24 Lead Slim SBDIP 24 Lead SBDIP 28 Pad CLCC
			250ns	100µA	-	20mA/MHz	
16K - SYNCHRONOUS - FUSE LINK							
HM-6617	2K x 8	B	90ns	100µA	-	20mA/MHz	24 Lead Slim SBDIP 24 Lead SBDIP 32 Pad CLCC
			120ns	100µA	-	20mA/MHz	

REAL-TIME CLOCKS

TYPE	COMMENTS AND APPLICATIONS	NUMBER OF PINS	μP INTERFACE					OSCILLATOR				TIME KEEPING FUNCTIONS							ALARM FUNCTIONS			POWER DOWN MODES			
			STANDARD μP INTERFACE	MUX BUS OPTION	PROGRAMMABLE SQUARE WAVE OUTPUT SIGNAL	INTERRUPTS	BYTES OF GENERAL PURPOSE RAM	ON BOARD OSCILLATOR	60Hz LINE	4.197MHz, 1.049MHz, 32.768kHz XTAL	2.097MHz XTAL	READS SEC., MIN., HR., DAY, MONTH	READS YEAR, DATE	DAYLIGHT SAVINGS TIME	AUTOMATIC END OF MONTH RECOGNITION	AUTOMATIC LEAP YEAR COMPENSATION	12 OR 24 HOUR CLOCK WITH AM/PM	BCD FORMAT AVAILABLE	1/10s, 1/100s ALARM	SEC., MIN., HR. ALARM	DAY, MONTH, YEAR, DATE ALARM	POWER SENSE INPUT/DETECTION	BATTERY INPUT PIN	STANDBY TIME KEEPING	POWER DOWN MODE (μA)
1800 SERIES																									
CDP1879	Real-Time Clock, 4V to 10.5V Operation	24	•		•	•		•		•	•	•					•	•		•					50
6805 SERIES																									
CDP6818 CDP6818A	Real-Time Clock, RAM, Motel Bus for Connection to any μP	24	•	•	•	•	50	•		•		•	•	•	•	•	•	•		•		•			50
CDP68HC68T1	Real-Time Clock with RAM and Power Sense/Control, 3-Wire SPI Bus Peripheral	16			•	•	32	•	•	•	•	•	•							•		•	•	•	12
GENERAL																									
ICM7170	Real-Time Clock-Time Keeping and Date Stamping for Personal Computers, Communica-tions, Robotics, Auto, etc.	24	•	•		•		•		•	•	•	•		•	•	•		•	•	•	•	•	•	5

TIMER/COUNTERS

TYPE	COMMENTS AND APPLICATIONS	μP I/F		COUNTER MODES						COUNTERS								
		STANDARD 8-BIT μP INTERFACE (RD, WR)	INTERRUPT ON TERMINAL COUNT	TIMEOUT OUTPUT CHANGES WHEN COUNTER DECREMENTS TO "0"	TIMEOUT STROBE ONE CLOCK-WIDE OUTPUT PULSE WHEN COUNTER DECREMENTS TO "0"	GATE CONTROLLED ONE-SHOT OUTPUT CHANGES WHEN COUNTER DECREMENTS TO "0". RETRIGGERABLE	SOFTWARE-CONTROLLED ONE-SHOT OUTPUT CHANGES WHEN COUNTER DECREMENTS TO "0". RETRIGGERABLE	RATE GENERATOR REPETITIVE CLOCK-WIDE OUTPUT PULSE	VARIABLE DUTY CYCLE REPETITIVE OUTPUT WITH PROGRAMMED FREQUENCY AND DUTY CYCLE	COUNTER FREQUENCY (MHz)	NUMBER OF CLOCK INPUTS	GATE ENABLED COUNTING	NUMBER OF GATES	NUMBER OF OUTPUTS	BINARY COUNTING	BCD COUNTING	NUMBER OF 16-BIT DOWN COUNTERS	NUMBER OF 8-BIT DOWN COUNTERS
1800 SERIES																		
CDP1878	Dual Timer/ Counter Power Supply, Motor Control, Square Wave Generators, One-Shot 4V to 10.5V Operation CDP1800 Series Peripheral	•	•	•	•	•		•	•	1	2	•	2	2	•		2	
80C86/88 SERIES																		
82C54	Programmable Interval Timer/ Counter for Generation of Accurate Time Delays Under Software Control in 80C86/88 System, Real-Time Clock, Motor Control, Watchdog Timer, Square Wave Gen.	•	•	•	•	•	•	•	• (Note 1)	10	3	•	3	3	•	•	3	
6805 SERIES																		
CDP68HC68W1	Digital Pulse Width Modulator, Modulates a Clock Input to Supply a Variable Freq. and Duty-Cycle Output Signal. 8-Lead DIP 6805 SPI Bus Serial I/F Motor Control								•	8	1			1	•			2

NOTE:

1. Reloading of count register will allow variable duty cycle. Otherwise this mode generates a square wave output.

TIMER/COUNTERS WITH DISPLAY DRIVERS

TYPE	COMMENTS AND APPLICATIONS	DISPLAY					FUNCTIONS																
		LED			LCD	VF	UNIT COUNT				UNIVERSAL COUNTERS												
		COMMON ANODE, NON-MUX	COMMON CATHODE, MUX	COMMON ANODE, MUX	DIRECT DRIVE, NON-MUX	NON-MUX	UP/DOWN	UP ONLY	DECADE	MODULE 60 (HR/MIN/SEC)	FREQUENCY	PERIOD	FREQUENCY RATIO	TIME INTERVAL	MUX BCD OUTPUTS	DISPLAY LATCH	DISPLAY BLANKING	COUNT ENABLE	LEADING ZERO BLANKING	PRESET COUNT	COMPARISON REGISTER	EQUAL AND ZERO OUTPUT	MAX COUNT SPEED (MHz)
4 DIGIT																							
ICM7217	Industrial Control: Preset Predetermining Counters, Sequencers, On Off Delay Timers, Batch Counters. Presets and Loads Compare Register From Thumbwheel Switches			•			•		•		(Note 1)				•	•	•		•	•	•	•	2
ICM7217A			•				•		•		(Note 1)				•	•	•		•	•	•	•	2
ICM7217B				•			•			•					•	•	•		•	•	•	•	2
ICM7217C			•				•			•					•	•	•		•	•	•	•	2
4.5 DIGIT																							
ICM7224	10μA Operating Current, Can Be Cascaded for More Digits				•			•	•		(Note 1)					•		•	•				15
ICM7225	Has Brightness Adjustment. 10μA Current with Display Blanked, Cascadable	•						•	•		(Note 1)					•	•	•	•				15
5.5 DIGIT																							
ICM7249	Event Timer Counter, Hour Meter. 14 Programmable Modes. Selectable Input Filtering				•			•	•					•									
7 DIGIT																							
ICM7208	Use with ICM7202A for a 7 Digit Frequency Counter		•					•	•		(Note 1)					•	•	•	•				2.5
8 DIGIT																							
ICM7216A	Universal Frequency Counter with Display Drivers. 4 Internal Gate Times, Auto Decimal Point, Leading Zero Blanking, Overflow Indication. Display Off, Hold, and Reset Inputs.			•				•	•		•	•	•	•		•	•		•				10
ICM7216B			•					•	•		•	•	•	•		•	•		•				10
ICM7216D			•					•	•		•					•	•		•				10
ICM7226A	Same as ICM7216 Plus Period and Time Interval Averaging. BCD Outputs, μP PIA Compatible			•				•	•		•	•	•	•	•	•	•	•	•				10
ICM7226B			•					•	•		•	•	•	•	•	•	•	•	•				10

NOTE:

1. These counters will measure frequency when used with the ICM7207 (0.01s or 0.1s timebase) or the ICM7207A (0.1s and 1s timebase).

DISPLAY DRIVERS

TYPE	COMMENTS AND APPLICATIONS	NUMBER OF CHARACTERS OR DIGITS						DISPLAY TYPE						FONT			INTERFACE				
		NUMBER OF 7-SEGMENT DIGITS	NUMBER OF DECIMAL POINTS OR ANNUNCIATORS	NUMBER OF ALPHANUMERIC 14 SEGMENTS + DP	NUMBER OF ALPHANUMERIC 16 SEGMENTS + DP	NUMBER OF ALPHANUMERIC 18 SEGMENTS	NUMBER OF DOT MATRIX	LED, COMMON ANODE NON-MUX	LED, COMMON CATHODE MUX	LED, COMMON ANODE MUX	LCD, DIRECT DRIVE	LCD, NUMBER OF WAYS MUX'D	VACUUM FLUORESCENT	HEXADECIMAL (0-9, A-F)	CODE B (0-9, H, E, L, P, -, AND BLANK)	ASCII	MUX BCD (BCD + DIGIT SELECT STROBES)	RANDOM ACCESS (DATA + ADDRESS + WR)	BIT PARALLEL, DIGIT SERIAL	BIT SERIAL	CYCLE TIME (ns)
ICM7211	Drives Conventional LCD Displays. Includes RC Oscillator, Divider Chain, Latches, Interface and LCD Drivers	4									•			•			•				1000
ICM7211A		4									•				•		•				1000
ICM7211M		4									•			•				•			200
ICM7211AM		4									•				•			•			200
ICM7212AM	Drives Common Anode LED Displays. 28 Current Controlled Outputs. Includes Latches, Interface and Brightness Control.	4						•							•			•			200
ICM7218A	3 Decode Formats Drives Up to 64 Independent LEDs. Includes 8 x 8 Memory, Multiplexed LED Drivers, Encoders, Interface and Control. Applications Include Bar Graphs.	8	8							•				•	•				•		550
ICM7218B		8	8						•					•	•			•			550
ICM7218C		8	8							•				•	•				•		500
ICM7218D		8	8						•					•	•			•			500
ICM7228A		8	8							•				•	•				•		550
ICM7228B		8	8						•					•	•			•			550
ICM7228C		8	8							•				•	•				•		500
ICM7228D		8	8						•					•	•			•			500
ICM7231BF	8 Digits, 16 Annunciators on COM 3, Code B	8	16									3			•			•			500
ICM7232A	10 Digits, 20 Annunciators on COM 3, Code B	10	20									3		•						•	350
ICM7232B	10 Digits, 20 Annunciators on COM 3, Code B	10	20									3			•					•	350
ICM7232C	10 Digits, 20 Annunciators on COM 1 +3, Code B	10	20									3			•					•	350
ICM7243A	8 Alphanumeric Characters + Decimal pt. can be Daisy Chained or Cascaded				8				•							•		•	•		250
ICM7243B				8					•							•		•	•		250
CA3161	BCD-to-Seven Segment Decoder Driver	1						•							•						2600

PARALLEL I/O INTERFACE

TYPE	COMMENTS AND APPLICATIONS	μP INTERFACE			PORT CONFIGURATION					INPUT/OUTPUT PORTS							
		STANDARD 8-BIT μP I/F	MULTIPLEXED BUS COMPATIBLE	INTERRUPTS	TOTAL NUMBER OF 8-BIT PORTS	INPUT PORTS PROGRAMMABLE	OUTPUT PORTS PROGRAMMABLE	BIDIRECTIONAL PORTS PROGRAMMABLE	INDIVIDUAL BITS PROGRAMMABLE	BIT SET/RESET	LATCHED INPUTS	LATCHED OUTPUTS	THREE-STATABLE OUTPUTS	DARLINGTON OUTPUT DRIVE	DIRECT READ OF OUTPUTS	STROBED INPUT/OUTPUT	STROBED BIDIRECTIONAL
CDP1851	Programmable I/O Interface, Interfaces Peripheral Equipment to the 1800μP, Keyboard and Display Interface, Printer or CRT Interface, LED Driver 4V to 10.5V Operating Range	•		•	2	2	2	1	20		•	•		•		•	•
CDP1852	8-Bit Input/Output Port, Interfaces 8-Bit Parallel Peripheral Equipment to the 1800μP, Address Latched, Keypad Interface, Printer Interface 4V to 10.5V Operating Range				1	1	1				•	•	•	•		•	
CDP1872					1	1					•		•				
CDP1874					1	1					•		•				
CDP1875					1		1					•					
CDP6823	Parallel Interface, Peripheral Equipment Interface for 6805μP, Motel Interface Circuit. Keyboard/Display I/F, Floppy Disc Interface, Printer/CTR Interface	•	•	•	3	3	3		24	•	•	•	•			•	
CDP68HC68P1	Single Port Input/Output 6805 SPI Bus Serial Interface 3V to 6V Operating Range, On Board Comparator (Compares Data Register and Port Pins) Port Expander, Keyboard/Printer Interface				1	1	1		8	•	•	•	•				
82C55A	Programmable Peripheral Interface Bus Hold Circuitry Eliminates Pull Up Resistors For Switch and LED Configuration	•		•	3	3	3	1		•	•	•	•	•	•	•	•

UARTS/BAUD RATE GENERATORS

TYPE	COMMENTS AND APPLICATIONS	PKG	μP INTERFACE							SERIAL INTERFACE					DATA/SET/MODEM CONTROLS				CLOCK/BAUD RATES				
		NUMBER OF PINS	RD/$\overline{WR}$ PIN	RD AND WR PINS	MUX BUS COMPATIBLE	NON-MUX BUS	NUMBER OF REGISTERS	PROGRAMMABLE INTERRUPTS	BUFFERED TRANSMIT/RECEIVE	OVERRUN, PARITY, FRAMING ERROR	PROGRAMMABLE DATA (5-8 BITS), STOP (1-2 BITS)	FULL DUPLEX	ECHO MODE/LOOP BACK	LINE BREAK GENERATION/ DETECTION	RTS, CRS, DR, TRE	DTR, DSR	DCD	RI	EXTERNAL/CLOCK	BAUD RATE (K BITS/s)	CLOCK DIVISOR (+N)	ON CHIP BAUD RATE GENERATOR	SEPARATE RCLK AND TCLK
CDP1854	Programmable UART with False Start-Bit Detection 4V to 10V Operation	40	•			•	4	•	•	•	•	•			•					200	16		•
CDP65C51, CDP65C51A	15 Programmable Baud Rates (250K Baud with External CLK) Data Set/Modem Control Functions	28	•			•	6	•	•	•	•	•	•	•	•	•	•		•	4.16	16	•	•
CDP6853	Programmable UART with Motel Bus (250K Baud with External CLK) Data Set/Modem Control Functions	28	•	•	•	•	6	•	•	•	•	•	•	•	•	•	•		•	4.16	16	•	•
82C50A	IBM PC Compatible Modem Interface	40		•	•	•	11	•	•	•	•	•	•	•	•	•	•	•	•	625	16	•	•
82C52	1M Baud Easy-to-Program UART/ Brg. 72 Selectable Baud Rates	28		•		•	8	•	•	•	•	•	•	•	•	•			•	1M	1	•	
HD6406	Programmable UART/Brg with Complete Modem I/F DMA Capability	40		•	•	•	8	•	•	•	•	•	•	•	•	•	•	•	•	1M	1	•	
HD-6402R	Industry Standard Stand-Alone UART 6402R-TTL Compatible Inputs	40					3		•	•	•	•								500	16		•
CDP6402		40					3		•	•	•	•								200	16		•
HD-4702	Programmable Bit Rate Generator Provides 13 Commonly Used Baud Rates	16																		195	16	•	

INDUSTRY CMOS RAM CROSS REFERENCE

DESCRIPTION	HARRIS	AMD	EDI	FUJI-TSU	HIT-ACHI	IDT	MITSU-BISHI	MOT-OROLA	NATIONAL	NEC	OKI	HARRIS/ RCA	SMOS	TOSH-IBA	NMOS, OTHER
1K CMOS RAMs															
1K x 1, 16 Lead Synchronous	HM-6508	-	-	8401	-	-	-	6508	6508 74C929	443	-	6508 1821	-	5508	2125, 4015
1K x 1, 18 Lead Synchronous	HM-6518	-	-	-	-	-	-	6518	6518 74C930	-	-	-	-	-	-
256 x 4, 22 Lead Synchronous	HM-6551	-	-	-	-	-	-	-	6551 74C920	-	-	1822 5101	-	5101	2101
256 x 4, 18 Lead Synchronous	HM-6561	-	-	-	-	-	-	-	-	-	-	-	-	-	2111
4K CMOS RAMs															
4K x 1, 18 Lead Synchronous	HM-6504	92L44	-	8404	4315 6147	-	-	6504	6504	-	5104	-	6504	5504	2141, 2147, 315D, 4104, 4404
1K x 4, 18 Lead Synchronous	HM-6514	91L14 91L24	-	8414	4334 6148	-	58981	6514	6514	444	5114 5115	5114	6514	5514	2114, 2148, 2149, 4045, 314A
16K CMOS RAMs															
2K x 8, 24 Lead Synchronous	HM-6516	-	-	-	-	-	-	-	6516	-	-	-	-	-	-
2K x 8, 24 Lead Asynchronous	HM-65162	-	-	8416	6116	6116	5117	65116	6116	446	5128	6116	2016	5517	4802, 2116, 2016, 4016
16K x 1, 20 Lead Asynchronous	HM-65262	-	-	8167	6167	6167	-	-	-	-	-	-	2267 2367	-	2167, 8167,1400
64K CMOS RAMs															
8K x 8, 28 Lead Asynchronous	HM65642	99C88	8808A	8464	6264	7164	5164	6164	6164	4464	-	6264	2064	5564	-

80CXXX FAMILY PERIPHERAL CROSS REFERENCE

HARRIS	INTEL	NEC	OKI	MITSUBISHI	VLSI	OTHER
PERIPHERALS						
82C37A-5	82C37A-5	µPD71037 µPD8237A-5	MSM82C37A-5	M5M82C37A-4, -5	VL82C37A-4 VL82C37A-5	TMP82C37A-5 CA82C37A-5
82C37A 82C237			MSM82C37A		VL82C37A-8	KS82C37A SMC82C37A
82C37A-12 82C237-12						
82C54	82C54	µPD71054	MSM82C54	M5M82C54-6 M5M82C54	VL82C54-8	AM82C54 KS82C54 CA82C54 TMP82C54
82C54-10	82C54-2		MSM82C54-2			AM82C54-2 KS82C54-10 TMP82C54-2
82C55A-5		µPD82C56A-5	MSM82C55A-5	M5M82C55A-5		
82C55A	82C55A-2	µPD71055 µPD8255A-2	MSM82C55A-2			AM82C55A KS82C55A CA82C55A UM82C55A
82C59A-5				M5M82C59A		
82C59A	82C59A-2	µPD71059 µPD8259A	MSM82C59-2		VL82C59A-8	AM82C59A-2 CA82C59A KS82C59A TMP82C59
82C59A-12						
UARTS						
82C50A					VL82C50A	INS82C50A CA82C50A WD82C50A KS82C50A
82C52						CA82C52 KS82C52
BUS SUPPORT						
82C284-10	82C284-10					KS82C284-10
82C284-12	82C284-12					KS82C284-12
82C82		µPD71082				
82C83H		µPD71083				
82C84A	82C84A 82C84A-5	µPD71084	MSM82C84A MSM82C84A-5 MSM82C84A-2		VL82C84A-8	CA82C84A KS82C84A
82C85						
82C86H		µPD71086				MMI82C86
82C87H		µPD71087				MMI82C87
82C88	82C88	µPD71088 µPD8288	MSM82C88 MSM82C88-2		VL82C88-8	CA82C88 KS82C88
82C89						

COMPARISON OF HARRIS CMOS CDP1800-SERIES MICROPROCESSORS

FEATURES	CDP1802A CDP1802AC	CDP1802BC	CDP1805AC	CDP1806AC
Memory Addressing (Bytes)	64K	64K	64K	64K
On-Chip RAM (Bytes)	-	-	64K	-
Maximum Clock Frequency (MHz)	3.2	5	5	5
Instruction Time Min./Max. (μs)	5/7.5	3.2/4.8	3.2/16	3.2/16
Timer/Counter Bits	-	-	8	8
Prescalers	-	-	÷ 32	÷ 32
Bus Structure	Multiplexed Address Lines			
Interrupts	Yes	Yes	Yes	Yes
Latched I/O Lines	Off-Chip			
Maximum Operating Temperature Range (^{o}C)	-55^{o}C to 125^{o}C			
Number of Pins, Package	40 D, E 44 Q	40 D, E 44 Q	40 D, E 44 Q	40 D, E 44 Q
Serial Interface	Q-Line			

INDUSTRY CMOS 16-BIT MICROPROCESSOR CROSS REFERENCE

HARRIS	INTEL	NEC	OKI	AMD
80C88	80C88	μPD70108D-5	MSM80C88A	-
80C88-2	80C88-2	μPD70108D-8	MSM80C88A-2	-
80C86	80C86	μPD70116D-5	MSM80C86A	-
80C86-2	80C86-2	μPD70116D-8	MSM80C86A-2	-
80C286-10	80286-10 80C286-10	-	-	80286-10
80C286-12	80286-12 80C286-12	-	-	80286-12
80C286-16	-	-	-	80286-16

CDP1800-SERIES CMOS PERIPHERALS Can be used with CMOS and NMOS Processors

HARRIS I/O TYPE	DESCRIPTION AND FUNCTION	HARRIS 1800 SERIES	MICROPROCESSOR BUS: MULTIPLEXED HARRIS/MOTOROLA 68HC05 6805	MULTIPLEXED INTEL 8048, 8051 80C48, 80C51 8049, 80C49 8088	MULTIPLEXED INTEL/NSC 8085 80C85 NSC800	NONMULTIPLEXED ZILOG Z80	NONMULTIPLEXED ROCKWELL 6502 65C02	INPUT LEVELS	(NOTE 2) FANOUT (TTL LOADS)
I/O PORTS									
CDP1851	Programmable I/O Port	Yes	Note 1	Note 1	Note 1	Yes	Yes	CMOS	1
CDP1852	Byte-Wide I/O Port	Yes	Yes	Yes	Yes	Yes	Yes	CMOS	1
CDP1857	4-Bit Bus Buffer/ Separator	Yes	Yes	Yes	Yes	Yes	Yes	CMOS	1
CDP1872	8-Bit Input Port	Yes	Yes	Yes	Yes	Yes	Yes	CMOS	3
CDP1874	8-Bit Input Port	Yes	Yes	Yes	Yes	Yes	Yes	CMOS	3
CDP1875	8-Bit Input Port	Yes	Yes	Yes	Yes	Yes	Yes	CMOS	3
MEMORY I/O DECODERS									
CDP1853	N-Bit 1 of 8 Decoder	Yes	Yes	Yes	Yes	Yes	Yes	CMOS	1
CDP1881	6-Bit Latch/Decoder	Yes	Yes	Yes	Yes	Yes	Yes	CMOS	1
CDP1882	6-Bit Latch/Decoder	Yes	Yes	Yes	Yes	Yes	Yes	CMOS	1
CDP1883	7-Bit Latch/Decoder	Yes	Yes	Yes	Yes	Yes	Yes	CMOS	1
SERIAL I/O									
CDP1854A (Note 3)	UART	Yes	Note 1	Note 1	Note 1	Note 1	Note 1	CMOS	1
CDP6402	UART	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1	CMOS	1
MULTIPLY/DIVIDE									
CDP1855	8-Bit Programmable MDU	Yes	Note 1	Note 1	Note 1	Note 1	Note 1	CMOS	1
KEYBOARD INTERFACE									
CDP1871A	Keyboard Encoder	Yes	Note 1	Note 1	Note 1	Note 1	Note 1	CMOS	
TIMER FUNCTIONS									
CDP1878	Dual Counter-Timer	Yes	Note 1	Note 1	Note 1	Yes	Yes	CMOS	1
CDP1879	Real-Time Clock	Yes	Use 6818, A	Use 6818, A	Use 6818, A	Yes	Yes	CMOS	1
INTERRUPT CONTROL									
CDP1877	Programmable Interrupt Controller	Yes	No	No	No	No	No	CMOS	1

NOTES:

1. Yes but requires additional "glue parts".
2. 1 TTL load, i.e., ≤0.4V at 1.6mA.
3. Operating in 1800 compatible mode (mode 1). Otherwise see CDP6402 for mode 0 information.

Digital Micro Packaging Selection Guide

PART NUMBER	PDIP	SOIC	CERDIP	CPGA	PLCC	CLCC	MQFP	SBDIP
MICROCONTROLLERS								
CDP68HC05C4/C4B	E40.6				N44.65		Q44.10x10	
CDP68HCL05C4/C4B	E40.6				N44.65		Q44.10x10	
CDP68HSC05C4/C4B	E40.6				N44.65		Q44.10x10	
CDP68HC05C8/C8B	E40.6				N44.65		Q44.10x10	
CDP68HCL05C8/C8B	E40.6				N44.65		Q44.10x10	
CDP68HSC05C8/C8B	E40.6				N44.65		Q44.10x10	
CDP68HC05J3	E20.3	M20.3						
CDP68HCL05J3	E20.3	M20.3						
CDP68HSC05J3	E20.3	M20.3						
CDP68HC05J4B		M20.3/M28.3						
CDP68HCL05J4B		M20.3/M28.3						
CDP68HSC05J4B		M20.3/M28.3						
CDP68HC05C16B	E40.6				N44.65		Q44.10x10	
CDP68HCL05C16B	E40.6				N44.65		Q44.10x10	
CDP68HSC05C16B	E40.6				N44.65		Q44.10x10	
CDP68HC05P4B		M28.3						
CDP68HCL05P4B		M28.3						
CDP68HSC05P4B		M28.3						
CDP68HC05D2	E40.6				N44.65		Q44.10x10	
CDP6805E2	E40.6				N44.65			D40.6
CDP6805E2C	E40.6				N44.65			D40.6
CDP6805E3	E40.6				N44.65			D40.6
CDP6805E3C	E40.6				N44.65			D40.6
CDP6402	E40.6							D40.6
CDP6402C	E40.6							D40.6
CDP65C51	E28.6	M28.3						D28.6
CDP6818	E24.6							D24.6
CDP6818A	E24.6				N28.45			D24.6
CDP6823	E40.6				N44.65			D40.6
CDP6853	E28.6							D28.6
CDP68HC68A2	E16.3	M20.3						
CDP68HC68P1	E16.3	M16.15						
CDP68HC68R1	E8.3							
CDP68HC68R2	E8.3							
CDP68HC68S1	E14.3	M20.3						
CDP68HC68T1	E16.3	M16.15/M20.3						D16.3
CDP68HC68W1	E8.3							
MICROCOMPUTERS								
CDP1802A, CDP1802AC	E40.6				N44.65			D40.6

Packaging information is available in Section 16.

PART NUMBER	PDIP	SOIC	CERDIP	CPGA	PLCC	CLCC	MQFP	SBDIP
CDP1802BC	E40.6				N44.65			D40.6
CDP1804AC	E40.6				N44.65			-
CDP1805AC	E40.6				N44.65			D40.6
CDP1806AC	E40.6				N44.65			D40.6
80C286	-			G68.B	N68.95			
80C86	E40.6		F40.6		N44.65	J44.A		
80C88	E40.6		F40.6		N44.65	J44.A		
MEMORY								
CDP1821C	-							D16.3
CDP1822, CDP1822C	E22.4							D22.4A
CDP1823, CDP1823C	E24.6							D24.6
CDP1824, CDP1824C	E18.3							D18.3
CDP1826C	E22.4							
HM-6504	E18.3		F18.3			J18.B		
HM-6508	E16.3		F16.3					
HM-6514	E18.3		F18.3			J18.B		
HM-6516	E24.6		F24.6			J32.A		
HM-65162	E24.6		F24.6			J32.A		
HM-6518	E18.3		F18.3					
HM-65262	E20.3		F20.3			J20.C		
HM-6551	E22.4		F22.4					
HM-6561	E18.3		F18.3					
HM-65642	E28.6		F28.6			J32.A		
HM-6617 (Note 1)						J32.A		D24.3 D24.6
HM-6642 (Note 1)						J28.A		D24.3 D24.6
IM6654								D24.6
MWS5101, MWS5101A	E22.4							D22.4A
MWS5114	E18.3							D18.3
CDP18XX PERIPHERALS								
CDP1851, CDP1851C	E40.6							D40.6
CDP1852, CDP1852C	E24.6							D24.6
CDP1853, CDP1853C	E16.3							D16.3
CDP1855, CDP1855C	E28.6							D28.6
CDP1857, CDP1857C	E16.3							D16.3
CDP1871A, CDP1871AC	E40.6				N44.65			D40.6
CDP1872C	E22.4							
CDP1874C	E22.4							
CDP1875C	E22.4							D22.4A
CDP1877, CDP1877C	E28.6							
CDP1878, CDP1878C	E28.6							D28.6

Packaging information is available in Section 16.

PART NUMBER	PDIP	SOIC	CERDIP	CPGA	PLCC	CLCC	MQFP	SBDIP
CDP1879, CDP1879C	E24.6							D24.6
CDP1881, CDP1881C	E20.3							
CDP1882, CDP1882C	E18.3							D18.3
CDP1883, CDP1883C	E20.3							
ICM7170	E24.6	M24.3						D24.6
80CXXX PERIPHERALS								
82C237	E40.6		F40.6		N44.65	J44.A		
82C284			F18.3					
82C37A	E40.6		F40.6		N44.65	J44.A		
82C54	E24.6	M24.3	F24.6		N28.45	J28.A		
82C55A	E40.6		F40.6		N44.65	J44.A		
82C59A	E28.6	M24.3	F28.6		N28.45	J28.A		
82C82	E20.3		F20.3		N20.35	J20.A		
82C83H	E20.3		F20.3		N20.35	J20.A		
82C84A	E18.3		F18.3		N20.35	J20.A		
82C85			F24.3		N28.45	J28.A		
82C86H	E20.3		F20.3		N20.35	J20.A		
82C87H	E20.3		F20.3		N20.35	J20.A		
82C88	E20.3		F20.3		N20.35	J20.A		
82C89	E20.3		F20.3		N20.35	J20.A		
DATA COMMUNICATIONS								
CDP1854A, CDP1854AC	E40.6				N44.65			D40.6
CDP6402, CDP6402C	E40.6							D40.6
HD-15530			F24.6			J28.A		
HD-15531	E40.6		F40.6					
HD-4702	E16.3		F16.3			J18.B		
HD-6402	E40.6		F40.6					
HD-6408	E24.6		F24.6					
HD-6409	E20.3	M20.3	F20.3			J20.A		
HS-3182						J28.A		D16.3
HS-3282			F40.6			J44.A		
ICL232	E16.3	M16.3	F16.3					
82C50A	E40.6		F40.6		N44.65			
82C52	E28.6		F28.6		N28.45	J28.A		

NOTE:

1. Available in Slim and Wide SBDIP.

Packaging information is available in Section 16.

DIGITAL LOGIC 12

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See Section 13 for Military and Space Logic products.

Harris CMOS Logic Families

HIGH SPEED CMOS (HC/HCT) LOGIC SSI, MSI LOGIC FUNCTIONS AND LOW CURRENT BUS INTERFACE DEVICES

- 3mm CMOS Process
- HCT Provides Drop-In Replacement for LSTTL
- HC Provides Direct Interface to CMOS
- Typical Gate Propagation Delay = 8ns at 5V
- JEDEC Standard 4mA, 6mA Sink/Source Drive Current Capability
- 2V to 6V Operation for HC Devices
- 4.5V to 5.5V Operation for HCT Devices
- -55 to 125°C Temperature Range

BiCMOS FCT BUS INTERFACE DEVICES

- 8-Bit, 9-Bit, and 10-Bit High Current Drive Bus Interface Devices
- 1.5mm, Low Power BiCMOS Process
- Drop-In Replacement for Bipolar FAST and AS Logic
- Typical Gate Propagation Delay = 3ns at 5V
- JEDEC Standard 64mA, 48mA Sink Current Capability
- 4.75V to 5.25V Operation
- No Input/Output Diodes to VCC
  - Eliminates Bus Contention
  - Allows Hot Card Insertion
- Low Ground Bounce VOLP = 1V Typical

CMOS 3.3V LPT AND LCX BUS INTERFACE DEVICES

- 0.6µm Process
- 5V I/O Tolerant
- Eliminates Bus Contention
- Allows Hot Card Insertion
- Speed Grades to C
  - Octal Types
  - Double Density (16-Bit) Types
  - Low Switching Noise and Ground Bounce

CD4000 LOGIC SSI AND MSI LOGIC FUNCTIONS

- 7mm CMOS Process
- CMOS Input Compatibility
- Typical Gate Propagation Delay = 60ns at 5V
- JEDEC Standard 0.4mA Sink/Source Drive Current Capability
- High Voltage Operation
  - 3V to 18V Operation for B Series (Operator 20V Typical)
- High Noise Immunity at 10V to 15V; Ideal for Noisy Environments
- -55 to 125°C Temperature Range

ADVANCED CMOS (AC/ACT) LOGIC SSI, MSI LOGIC FUNCTIONS AND MEDIUM CURRENT BUS INTERFACE DEVICES

- 1.5mm CMOS Process
- ACT Provides Drop-In Replacement for Bipolar FAST™
- AC Provides Direct Interface to CMOS
- Typical Gate Propagation Delay = 3ns at 5V
- JEDEC Standard 24mA Sink/Source Drive Current Capability
- 1.5V to 5.5V Operation for AC Devices
- 4.5V to 5.5V Operation for ACT Devices
- Low Ground Bounce VOLP = 1V Typical
- High Noise Immunity (AC Devices)

CMOS 5V FCT BUS INTERFACE DEVICES

- TTl Output Swing-NMOS Pull Up; No Clamp to V_{CC}
  - Eliminates Bus Contention
  - Allows Hot Card Insertion
- 8 - 10 Bit Devices (0.8µm CMOS)
  - 64 mA (IOL) High Drive
    - Replaces Fast™ and ABT™
    - Speed Grades To D(4.4ns)
    - Competitive Switching Noise
  - 12mA(IOL) Low Switching Noise
    - Speed Grades To C(5.8ns)
    - Reduced Ground Bounce
- Double Density 16-20 Bit Devices (0.6µm CMOS)
  - Speed Grades To E(3.2ns)
  - 48 and 56 Pin Surface Mount Package
    - Multiple Ground and V_{CC} Pins (Less Noise)
  - 64mA (IOL) High Drive
    - <1V Ground Bounce
  - Balanced (± 24mA) Drive
    - Bus Hold Option Devices Available
    - Reduced Switching Noise; <.6V Ground Bounce
  - Quite Series (± 12mA Drive)
    - Bus Hold
    - Very Low Switching Noise: <.5 Ground Bounce
  - Double Density 3.3V CMOS FCT Bus Interface Devices
  - 0.6µm Process
  - Inputs Can Be Up To 5V
  - Speed Grades to C
  - ±24mA Drive, Low Ground Bounce

See Section 13 for Military and Space Logic products.

FAST™ is a trademark of Fairchild Semiconductor.

Logic Ordering Nomenclature

5962 SMD/DESC - QML TYPES

5962 - XXXXX 0X X X X

SMD ID NUMBER
(Does Not Change) (ID Not Applicable in Earlier DESC Items)

DEVICE CLASS DESIGNATOR
-: Non-Rad Hard
M: 3×10^3 (3K RADS)
D: 10^4 (10K RADS)
R: 10^5 (100K RADS)
F: 3×10^5 (300K RADS)

DRAWING NUMBER
(DESC AND SMD)

DEVICE TYPE
(Paragraph 1.2.1 Of SMD/DESC Drawing)

DEVICE CLASS DESIGNATOR
(If Applicable)
Q: QML Class B (38535)
M: QML Class B (MIL-STD-883)
V: QML Class S, Space Level
N: Non-Traditional Packages and Temperature Ranges (i.e., Plastic Packages, -40°C to 85°C Temperature Range)

CASE OUTLINE
Case outlines are listed in the specific SMD and detailed in MIL-STD-1835, Section 4.

LEAD FINISH
A = Solder Dip
C = Gold

NOTE: Nomenclature Per MIL-PRF-38535

CD (AC, ACT, HC, HCT) TYPES

CD XX XXX XXXXX XX XX

Prefix Designation for Harris CMOS Digital Logic IC

TEMPERATURE RANGE
54/74: Refer to Individual Data Sheets for Temperature Range

LOGIC LEVEL
AC: Advanced CMOS Logic CMOS Input Levels
ACT: Advanced CMOS Logic TTL Input Levels
HC: High Speed CMOS Logic CMOS Input Levels
HCT: High Speed CMOS Logic TTL Input Levels
HCU: High Speed CMOS Logic CMOS Input Levels, Unbuffered

Type Designation Up to 5 Digits

PACKAGE DESIGNATOR
E: Dual-In-Line Plastic (PDIP)
EN: Narrow Dual-In-Line Plastic (PDIP)
F: Ceramic Dual-In-Line Frit-Seal(CERDIP)
H: Chip
M: Small Outline Plastic (SOIC)
SM: Shrink Small Outline Plastic (SSOP)
W: Wafer

HIGH-RELIABILITY SCREENING
3A: Fully Compliant with MIL-STD-883
X: 160 Hour Burn-In (125°C)
96: Tape and Reel

NOTE: Most Harris CMOS Logic ICs are available with burn-in to enhance commercial reliability. This cost-effective approach is provided by the Harris Enhanced Product. Enhanced Product is identified with the suffix "X", e.g., CD74HC/HCT373EX.

See Section 13 for Military and Space Logic products.

CD (FCT, LPT, LCX) TYPES

CD XX XXX XXXXXX X X X XX

Prefix Designation for Harris CMOS Digital Logic IC

TEMPERATURE RANGE
29/54/74: Refer to Individual Data Sheets for Temperature Range

LOGIC LEVEL
FCT: Bus Interface 5.0V and 3.3V CMOS Family 5.0V BiCMOS Family
LPT: Low Power Technology 3.3V CMOS Family
LCX: Low Power Technology 3.3V CMOS Family

TYPE DESIGNATION
Up to 6 Digits
XXX: 8-Bit/9-Bit/10-Bit
16XXX: 16-Bit/18-Bit/20-Bit
162XXX: 16-Bit with Balanced or High Drive Output
162HXXX: 16-Bit, with Bus Hold and 25Ω Series Output Resistor
162QXXX: 16-Bit, 25Ω Quiet Series
163XXX: 16-Bit 3.3V FCT (Recommend Harris LPT 3V Family)
2XXX: 25Ω Series Output Resistor.

SPEED GRADE
Blank: Lowest Speed
A:
B:
C:
D:
E: Highest Speed
NOTE: Refer to Individual Data Sheet for Speed Grade Detail.

OUTPUT VOLTAGE
T: TTL Output Levels
Blank: Non-TTL Output Levels

NOTE: BiCMOS FCT has TTL output levels and show either Blank or T

PACKAGE DESIGNATOR
E: Dual-In-Line Plastic (PDIP)
EN: Narrow Dual-In-Line Plastic
F: Dual-In-Line Ceramic (CERDIP)
H: Chip
M: 300 mil, Small Outline Plastic (SOIC)
NM: 150 mil, Small Outline Plastic (SOIC)
MT: Thin Shrink Small Outline (TSSOP)
QM: 150 mil, Shrink Small Outline Plastic (SSOP/QSOP)
SM: 209 or 300 mil, Shrink Small Outline Plastic (SSOP)

NOTE: The E, EN and F package options are only offered in BiCMOS technology for FCT products.

PACK DESIGNATOR
Blank: Tube
96: Tape and Reel

CD4000 TYPES

CD 4XXXX XX X X

Prefix Designation for Harris Digital Logic IC

Type Designation Up to 5 Digits

SUPPLY VOLTAGE
A: 12V Max
B: 18V Max
UB: 18V Max, Unbuffered

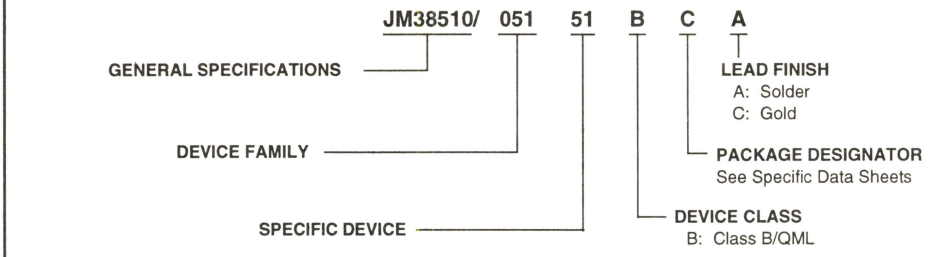
PACKAGE DESIGNATOR
E: Dual-In-Line Plastic (PDIP)
F: Ceramic Dual-In-Line Frit-Seal (CERDIP)
K: Ceramic Flatpack
M: Small Outline Plastic (SOIC)
H: Chip
W: Wafer

HIGH-RELIABILITY SCREENING
3: Non-Compliant with MIL-STD-883 Class B
3A: Fully Compliant with MIL-STD-883 Class B (Note 1)
X: 160 Hour Burn-In (125°C) (Note 2)

NOTES:
1. JAN (38510) or SMD (5962) numbers must be used for order entry, where these options exist.
2. Most Harris CMOS Logic ICs are available with burn-in to enhance commercial reliability. This cost-effective approach is provided by the Harris Enhanced Product. Enhanced Product is identified with the suffix "X", e.g., CD4016BEX.

See Section 13 for Military and Space Logic products.

JM JAN-QML TYPES



See Section 13 for Military and Space Logic products.

CD4000/HC/HCT/AC/ACT Family

ANALOG AND DIGITAL MULTIPLEXERS/DEMULTIPLEXERS

CD4000

CD4016B
CMOS Quad Bilateral Switch
CD4019B
CMOS Quad AND/OR Select Gate
CD4051B
CMOS Analog Multiplexer/Demultiplexer
CD4052B
CMOS Analog Multiplexer/Demultiplexer
CD4053B
CMOS Analog Multiplexer/Demultiplexer
CD4066B
CMOS Quad Bilateral Switch
CD4067B
CMOS Analog Multiplexer/Demultiplexer
CD4097B
CMOS Analog Multiplexer/Demultiplexer
CD4512B
CMOS 8-Channel Data Selector
CD4519B
CMOS 4-Bit AND/OR Selector, Quad 2-Channel Data Selector, or Quad Exclusive NOR Gate
CD4529B
CMOS Dual 4-Channel Analog Data Selector
CD4555B
CMOS Dual Binary-to-1-to-4 Decoder/Demultiplexer
CD4556B
CMOS Dual Binary-to-1-to-4 Decoder/Demultiplexer
CD40257B
10-Line to 4-Line BCD Priority Encoder
CD4046B
CMOS Micropower Phase-Locked Loop

HIGH-SPEED CMOS

HC/HCT151
8-Input Multiplexer
HC/HCT153
Dual 4-Input Multiplexer
HC/HCT157
Quad 2-Input Multiplexer
HC/HCT158
Quad 2-Input Multiplexer, Inverting
HC/HCT251
8-Input Multiplexer, Three-State
HC/HCT253
Dual 4-Input Multiplexer, Three-State
HC/HCT257
Quad 2-Input Multiplexer, Three-State; Non-Inverting Outputs
HC/HCT258
Quad 2-Input Multiplexer, Three-State; Inverting Outputs
HC/HCT354
8-Input Multiplexer/Register, Three-State
HC/HCT356
8-Input Multiplexer/Register, Three-State
HC/HCT4051
8-Channel Analog Multiplexer/Demultiplexer
HC/HCT4052
Dual 4-Channel Analog Multiplexer/Demultiplexer
HC/HCT4053
Triple 2-Channel Analog Multiplexer/Demultiplexer
HC/HCT4067
16-Channel Analog Multiplexer/Demultiplexer
HC/HCT4351
Analog MUX with Latch
HC/HCT4352
Analog MUX with Latch
HC/HCT4353
Analog MUX with Latch

ADVANCED CMOS

AC/ACT138
3-to-8-Line Decoder/Demultiplexer, Inverting
AC/ACT139
Dual 2-to-4-Line Decoder/Demultiplexer
AC/ACT151
8-Input Multiplexer
AC/ACT153
Dual 4-Input Multiplexer
AC/ACT157
Quad 2-Input Multiplexer
AC/ACT158
Quad 2-Input Multiplexer, Inverting
AC/ACT238
3-to-8-Line Decoder/Demultiplexer
AC/ACT251
8-Input Multiplexer, Three-State
AC/ACT253
Dual 4-Input Multiplexer, Three-State
AC/ACT257
Quad 2-Input Multiplexer, Three-State
AC/ACT258
Quad 2-Input Multiplexer, Three-State

ANALOG SWITCHES

CD4000

CD4016B
CMOS Quad Bilateral Switch
CD4066B
CMOS Quad Bilateral Switch

HIGH-SPEED CMOS

HC/HCT4016
Quad Bilateral Switch
HC/HCT4066
Quad Bilateral Switch
HC/HCT4316
Quad Analog Switch

CD4000/HC/HCT/AC/ACT Family (Continued)

ARITHMETIC CIRCUITS

CD4000

CD4008B
CMOS 4-Bit Full Adder
CD4063B
CMOS 4-Bit Magnitude Comparator
CD4560B
CMOS NBCD Adder
CD4585B
CMOS 4-Bit Magnitude Comparator
CD4089B
CMOS Binary Rate Multiplier
CD4527B
CMOS BCD Rate Multiplier

HIGH-SPEED CMOS

HC/HCT280
9-Bit Odd/Even Parity Generator/ Checker
HC/HCT283
4-Bit Adder with Fast Carry
HC/HCT583
4-Bit BCD Full Adder with Fast Carry
HC/HCT688
8-Bit Magnitude Comparator

ADVANCED CMOS

AC/ACT280
8-Bit Odd/Even Parity Generator/ Checker
AC/ACT283
4-Bit Full Adder with Fast Carry

BUS TRANSCEIVERS

HIGH-SPEED CMOS

HC/HCT242
Quad-Bus Transceiver, Three-State, Inverting
HC/HCT243
Quad-Bus Transceiver, Three-State
HC/HCT245
Octal-Bus Transceiver, Three-State
HC/HCT640
Octal Bus Transceiver, Three-State, Inverting
HC/HCT643
Octal Bus Transceiver, Three-State, True/Inverting
HC/HCT646
Octal Bus Transceiver/Register, Three-State
HC/HCT648
Octal Bus Transceiver/Register, Three-State, Inverting

ADVANCED CMOS

AC/ACT245
Octal-Bus Transceiver, Three-State
AC/ACT623
Octal-Bus Transceiver, Three-State, Non-Inverting
AC/ACT646
Octal-Bus Transceiver/Register, Three-State
AC/ACT647
Octal-Bus Transceiver/Register with Open Drain, Non-Inverting
AC/ACT648
Octal Bus Transceiver/Register, Three-State, Inverting
AC/ACT651
Octal-Bus Transceiver/Register, Three-State, Inverting
AC/ACT652
Octal-Bus, Transceiver/Register, Three-State, Non-Inverting
AC/ACT653
Octal-Bus Transceiver/Register; Open-Drain (A-Side); Three-State (B-Side); Inverting
AC/ACT654
Octal-Bus Transceiver/Register; Open-Drain (A-Side); Three-State (B-Side); Non-Inverting
AC/ACT7623
Octal-Bus Transceiver/Register; Open-Drain (A-Side); Three-State (B-Side); Non-Inverting

CD4000/HC/HCT/AC/ACT Family (Continued)

COUNTERS

HIGH-SPEED CMOS

HC/HCT93
4-Bit Binary Ripple Counter
HC/HCT160
Synchronous BCD Decade Counter, Asynchronous Reset
HC/HCT161
Synchronous 4-Bit Binary Counter, Asynchronous Reset
HC/HCT162
Synchronous BCD Decade Counter, Synchronous Reset
HC/HCT163
Synchronous 4-Bit Binary Counter, Synchronous Reset
HC/HCT190
Presettable Synchronous BCD Decade Up/Down Counter
HC/HCT191
Synchronous 4-Bit Binary Up/Down Counter
HC/HCT192
Synchronous BCD Decade Up/Down Counter
HC/HCT193
Synchronous 4-Bit Binary Up/Down Counter
HC/HCT390
Dual Decade Ripple Counter
HC/HCT393
Dual 4-Bit Binary Ripple Counter
HC/HCT4017
Decade Counter/Divider with 10 Decoded Outputs
HC/HCT4020
14-Stage Binary Ripple Counter
HC/HCT4024
7-Stage Binary Ripple Counter
HC/HCT4040
12-Bit Binary Counter
HC/HCT4059
Programmable Divide by "N" Counter
HC/HCT4060
14-Stage Binary Counter with Oscillator
HC/HCT4510
Up/Down Counter, BCD
HC/HCT4516
Up/Down Counter, Binary
HC/HCT4518
Dual Synchronous BCD Counter
HC/HCT4520
Dual 4-Bit Synchronous Binary Counter
HC/HCT40102
8-Bit Synchronous BCD Down Counter
HC/HCT40103
8-Bit Binary Down Counter

ADVANCED CMOS

AC/ACT161
Synchronous 4-Bit Binary Counter, Asynchronous Reset
AC/ACT163
Synchronous 4-Bit Binary Counter, Synchronous Reset
AC/ACT191
Synchronous 4-Bit Binary Up/Down Counter
AC/ACT193
Synchronous 4-Bit Binary Up/Down Counter
AC/ACT7060
14-Stage Binary Counter with Oscillator

CD4000

CD4024B
CMOS Ripple-Carry Binary Counter/Divider (7-Stage)
CD4040B
CMOS Ripple-Carry Binary Counter/Divider (12-Stage)
CD4020B
CMOS Ripple-Carry Binary Counter/Divider (14-Stage)
CD4060B
CMOS 14-Stage Ripple-Carry Binary Counter/Divider and Oscillator
CD4521B
CMOS 24-Stage Frequency Divider
CD4045B
CMOS 21-Stage Counter
CD4536B
CMOS Programmable Timer
CD4566B
CMOS Industrial Time-Based Generator
CD4017B
CMOS Counter/Divider
CD4022B
CMOS Counter/Divider
CD4018B
CMOS Presettable Divide-By-N Counter
CD4059B
Programmable Divide-By-N Counter
CD4522B
CMOS Programmable BCD Divide-By-N Counter
CD4029B
CMOS Presettable Up/Down Counter
CD4510B
CMOS Presettable Up/Down Counter
CD40192B
CMOS Presettable Up/Down Counter (Dual Clock with Reset)
CD4516B
CMOS Presettable Up/Down Counter
CD40193B
CMOS Presettable Up/Down Counter (Dual Clock with Reset)
CD40102B
CMOS 8-Stage Presettable Synchronous Down Counter
CD40103B
CMOS 8-Stage Presettable Synchronous Down Counter
CD4518B
CMOS Dual Up Counter
CD4520B
CMOS Dual Up Counter
CD40160B
CMOS Synchronous Programmable 4-Bit Counter
CD40161B
CMOS Synchronous Programmable 4-Bit Counter
CD40163B
CMOS Synchronous Programmable 4-Bit Counter

CD4000/HC/HCT/AC/ACT Family (Continued)

DECODERS/ENCODERS

CD4000

CD4028B
CMOS BCD-to-Decimal Decoder
CD4514B
CMOS 4-Bit Latch/4-to-16-Line Decoder
CD4515B
CMOS 4-Bit Latch/4-to-16-Line Decoder
CD4532B
CMOS 8-Bit Priority Encoder
CD4555B
CMOS Dual Binary-to-1-to-4 Decoder/Demultiplexer
CD4556B
CMOS Dual Binary-to-1-to-4 Decoder/Demultiplexer
CD40147B
10-Line to 4-Line BCD Priority Encoder

HIGH-SPEED CMOS

HC/HCT42
BCD-to-Decimal Decoder (1-to-10)
HC/HCT137
3-to-8-Line Decoder with Latch, Inverting
HC/HCT138
3-to-8-Line Decoder/Demultiplexer, Inverting
HC/HCT139
Dual 2-to-4-Line Decoder/Demultiplexer
HC/HCT147
10-to-4-Line Priority Encoder
HC/HCT154
4-to-16-Line Decoder/Demultiplexer
HC/HCT237
3-to-8-Line Decoder/Demultiplexer with Address Latches
HC/HCT238
3-to-8-Line Decoder/Demultiplexer
HC/HCT4511
BCD-to-7-Segment Latch/Decoder/Driver
HC/HCT4514
4-to-16-Line Decoder/Demultiplexer with Input Latch
HC/HCT4515
4-to-16-Line Decoder with Input Latches
HC/HCT4543
BCD-to-7-Segment Latch Decoder/Driver for LCDs

ADVANCED CMOS

AC/ACT138
3-to-8-Line Decoder/Demultiplexer, Inverting
AC/ACT139
Dual 2-to-4-Line Decoder/Demultiplexer
AC/ACT238
3-to-8-Line Decoder/Demultiplexer

CD4000/HC/HCT/AC/ACT Family (Continued)

FLIP-FLOPS

CD4000

CD4013B
CMOS Dual D-Type Flip-Flop
CD4027B
CMOS Dual J-K Master-Slave Flip-Flop
CD4095B
CMOS Gated J-K Master-Slave Flip-Flop
CD4096B
CMOS Gated J-K Master-Slave Flip-Flop
CD40174B
CMOS Hex D-Type Flip-Flop
CD40175B
CMOS Quad D-Type Flip-Flop

HIGH SPEED CMOS

HC/HCT73
Dual J-K Flip-Flop with Reset
HC/HCT74
Dual D Flip-Flop with Set and Reset
HC/HCT107
Dual J-K Flip-Flop with Reset
HC/HCT109
Dual J-K Flip-Flop with Set and Reset
HC/HCT112
Dual J-K Flip-Flop with Set and Reset
HC/HCT173
Quad D Flip-Flop, Three-State
HC/HCT174
Hex D-Type Flip-Flop with Reset
HC/HCT175
Quad D-Type Flip-Flop with Reset
HC/HCT273
Octal D-Type Flip-Flop with Reset
HC/HCT374
Octal D Flip-Flop, Three-State
HC/HCT377
Octal D-Type Flip-Flop with Data Enable
HC/HCT534
Octal D Flip-Flop, Three-State, Inverting
HC/HCT564
Octal D Flip-Flop, Three-State, Inverting
HC/HCT574
Octal D Flip-Flop, Three-State

ADVANCED CMOS

AC/ACT74
Dual D Flip-Flop with Set and Reset
AC/ACT109
Dual J-K Flip-Flop with Set and Reset
AC/ACT112
Dual J-K Flip-Flop with Set and Reset
AC/ACT174
Hex D-Type Flip-Flop with Reset
AC/ACT175
Quad D-Type Flip-Flop with Reset
AC/ACT273
Octal D-Type Flip-Flop with Reset
AC/ACT374
Octal D Flip-Flop, Three-State
AC/ACT534
Octal D Flip-Flop, Three-State, Inverting
AC/ACT564
Octal D-Type Flip-Flop, Three-State, Inverting
AC/ACT574
Octal D-Type Flip-Flop, Three-State

LATCHES

CD4000

CD4042B
CMOS Quad Clocked D Latch
CD4043B
CMOS Quad Three-State R/S Latch
CD4044B
CMOS Quad Three-State R/S Latch
CD4508B
CMOS Dual 4-Bit Latch
CD4099B
CMOS 8-Bit Addressable Latch
CD4724B
CMOS 8-Bit Addressable Latch
CD4099B
CMOS 8-Bit Addressable Latch
CD4724B
CMOS 8-Bit Addressable Latch

HIGH SPEED CMOS

HC/HCT75
Dual 2-Bit Bistable Transparent Latch
HC/HCT259
8-Bit Addressable Latch
HC/HCT373
Octal Transparent Latch, Three-State
HC/HCT533
Octal Transparent Latch, Three-State, Inverting
HC/HCT563
Octal Transparent Latch, Three-State, Inverting
HC/HCT573
Octal Transparent Latch, Three-State

ADVANCED CMOS

AC/ACT373
Octal Transparent Latch, Three-State
AC/ACT533
Octal Transparent Latch, Three-State, Inverting
AC/ACT563
Octal Inverting Transparent Latch, Three-State
AC/ACT573
Octal Transparent Latch, Three-State

CD4000/HC/HCT/AC/ACT Family (Continued)

REGISTERS

CD4000

CD4076B
CMOS 4-Bit D-Type Register
CD4015B
CMOS Dual 4-Stage Static Shift Register
CD4006B
CMOS 18-Stage Static Shift Register
CD4031B
CMOS 64-Stage Static Shift Register
CD4517B
CMOS Dual 64-Stage Static Shift Register
CD4014B
CMOS 8-Stage Static Shift Register
CD4021B
CMOS 8-Stage Static Shift Register
CD4035B
CMOS 4-Stage Parallel-In/Parallel-Out Shift Register
CD40194B
CMOS 4-Bit Bidirectional Universal Shift Register
CD4034B
CMOS 8-Stage Static Bidirectional Parallel/Serial Input/Output Bus Register
CD40100B
CMOS 32-Stage Static Left/Right Shift Register
CD4094B
CMOS 8-Stage Shift-and-Store Bus Register
CD4076B
CMOS 4-Bit D-Type Register
CD40105B
CMOS FIFO Register

HIGH SPEED CMOS

HC/HCT164
8-Bit Serial-In/Parallel-Out Shift Register
HC/HCT165
8-Bit Parallel-In/Serial-Out Shift Register
HC/HCT166
8-Bit Parallel-In/Serial-Out Shift Register
HC/HCT194
4-Bit Bidirectional Universal Shift Register
HC/HCT195
4-Bit Parallel Access Shift Register
HC/HCT299
8-Bit Universal Shift Register Three-State
HC/HCT40104
4-Bit Bidirectional Universal Shift Register, Three-State
HC/HCT40105
4 Bits x 16 Words FIFO Register
HC/HCT4015
Dual 4-Stage Static Shift Register
HC/HCT4094
8-Stage Shift-and-Store Bus Register
HC/HCT597
8-Bit Shift Register with Input Storage
HC/HCT670
4 x 4 Register File, Three-State
HC/HCT7030
9-Bit x 64 Word FIFO Register, Three-State

ADVANCED CMOS

AC/ACT164
8-Bit Serial-In/Parallel-Out Shift Register
AC/ACT299
8-Bit Universal Shift Register, Three-State
AC/ACT323
8-Bit Universal Shift Register, Three-State, (with Synchronous Reset)

CD4000/HC/HCT/AC/ACT Family (Continued)

GATES/MULTIFUNCTION/AOI

CD4000

GATES

CD4572UB
CMOS Hex Gate
CD4002B
CMOS NOR Gate
CD4012B
CMOS NAND Gate
CD4025B
CMOS NOR Gate
CD4023B
CMOS NAND Gate
CD4001B
CMOS NOR Gate
CD4001UB
CMOS Quad 2-Input NOR Gate
CD4011B
CMOS NAND Gate
CD4011UB
CMOS Quad 2-Input NAND Gate
CD4078B
CMOS 8-Input NOR/OR Gate
CD4068B
CMOS 8-Input NAND/AND Gate
CD40107B
CMOS Dual 2-Input NAND Buffer/Driver
CD4072B
CMOS OR Gate
CD4082B
CMOS AND Gate
CD4075B
CMOS AND Gate
CD4073B
CMOS AND Gate
CD4071B
CMOS OR Gate
CD4081B
CMOS AND Gate

MULTIFUNCTION/AOI

CD4030B
CMOS Quad Exclusive-OR Gate
CD4070B
CMOS Quad Exclusive-OR Gate
CD4077B
CMOS Quad Exclusive-NOR Gate
CD4019B
CMOS Quad AND/OR Select Gate
CD4085B
CMOS Expandable Dual 2-Wide 2-Input AND-OR-INVERT Gate
CD4086B
CMOS Expandable 4-Wide 2-Input AND-OR-INVERT Gate
CD4048B
CMOS Expandable 8-Input Gate
CD4572UB
CMOS Hex Gate, 4 Inverters, 2-2 Input Gates

ADVANCED CMOS

AC/ACT00
Quad 2-Input NAND Gate
AC/ACT02
Quad 2-Input NOR Gate
AC/ACT10
Triple 3-Input NAND Gate
AC/ACT20
Dual 4-Input NAND Gate
AC/ACT08
Quad 2-Input AND Gate
AC/ACT32
Quad 2-Input OR Gate
AC/ACT86
Quad 2-Input Exclusive-OR Gate

HIGH-SPEED CMOS

HC/HCT00
Quad 2-Input NAND Gate
HC/HCT02
Quad 2-Input NOR Gate
HC/HCT03
Quad 2-Input NAND Gate with Open Drain
HC/HCT10
Triple 3-Input NAND Gate
HC/HCT20
Dual 4-Input NAND Gate
HC/HCT27
Triple 3-Input NOR Gate
HC/HCT30
8-Input NAND Gate
HC/HCT4002
Dual 4-Input NOR Gate
HC/HCT08
Quad 2-Input AND Gate
HC/HCT11
Triple 3-Input AND Gate
HC/HCT21
Dual 4-Input AND Gate
HC/HCT32
Quad 2-Input OR Gate
HC/HCT86
Quad 2-Input Exclusive-OR Gate
HC/HCT4075
Triple 3-Input OR Gate
HC7266
Quad Exclusive-NOR Gate

INTERFACE/LEVEL CONVERTERS

CD4000

CD40109B
CMOS Quad Low-to-High Voltage Level Shifter
CD4009UB
CMOS Hex Buffer/Converter
CD4049UB
CMOS Hex Buffer/Converter
CD4010B
CMOS Hex Buffer/Converter
CD4050B
CMOS Hex Buffer/Converter
CD4504B
CMOS Hex Voltage-Level Shifter for TTL-to-CMOS or CMOS-to-CMOS Operation
CD40107B
CMOS Dual 2-Input NAND Buffer/Driver (Open Drain)
CD40116
8-Bit Bidirectional CMOS/TTL Interfaced Level Converter
CD40117B
Programmable Dual 4-Bit Terminator

CD4000/HC/HCT/AC/ACT Family (Continued)

INVERTERS/BUFFERS

CD4000

BUFFERS

CD4009UB
CMOS Hex Buffer/Converter
CD4010B
CMOS Hex Buffer/Converter
CD4041UB
CMOS Quad True/Complement Buffer
CD4049UB
CMOS Hex Buffer/Converter
CD4050B
CMOS Hex Buffer/Converter
CD4503B
CMOS Hex Buffer
CD4572UB
CMOS Hex Gate
CD40107B
CMOS Dual 2-Input NAND Buffer/Driver

INVERTERS

CD4007UB
CMOS Dual Complementary Pair Plus Inverter
CD4069UB
CMOS Hex Inverter
CD4502B
CMOS Strobed Hex Inverter/ Buffer

ADVANCED CMOS

BUFFERS

AC/ACT04
Hex Inverter/Buffer
AC/ACT05
Hex Inverter/Buffer with Open-Drain Outputs

HIGH-SPEED CMOS

BUFFERS

HC/HCT125
Quad Three-State Buffer
HC/HCT126
Quad Three-State Buffer

INVERTERS

HC/HCT04
Hex Inverter/Buffer
HCU04
Hex Inverter (Unbuffered)
HC4049
Hex Inverting High-to-Low Level Shifter
HC4050
Hex High-to-Low Level Shifter

BUS INTERFACE

HIGH-SPEED CMOS

HC/HCT240
Octal Buffer Line Driver, Three-State, Inverting
HC/HCT241
Octal Buffer Line Driver, Three-State
HC/HCT244
Octal-Buffer Line Driver, Three-State
HC/HCT365
Hex Buffer/Line Driver, Three-State
HC/HCT366
Hex Buffer/Line Driver, Three-State, Inverting
HC/HCT367
Hex Buffer/Line Driver, Three-State
HC/HCT368
Hex Buffer/Line Driver, Three-State, Inverting
HC/HCT540
Octal Buffer Line Driver, Three-State, Inverting
HC/HCT541
Octal Buffer Line Driver, Three-State

ADVANCED CMOS

AC/ACT240
Octal Buffer/Line Driver, Three-State, Inverting
AC/ACT244
Octal-Buffer/Line Driver, Three-State
AC/ACT540
Octal Buffer/Line Driver, Three-State, Inverting
AC/ACT541
Octal Buffer/Line Driver, Three-State

DISPLAY DRIVERS

CD4000

CD40107B
CMOS Dual 2-Input NAND Buffer/Driver
CD40110B
CMOS Decade Up-Down Counter/Latch/ Display Driver
CD4026B
CMOS Decade Counter/Divider
CD4033B
CMOS Decade Counter/Divider
CD4054B
CMOS Liquid-Crystal Display Driver
CD4055B
CMOS Liquid-Crystal Display Driver
CD4056B
CMOS Liquid-Crystal Display Driver
CD4511B
CMOS BCD-to-7-Segment Latch Decoder Driver
CD4543B
CMOS BCD-to-7-Segment Latch/Decoder/Driver for Liquid-Crystal Display
CD7211
CMOS 4-Digit LCD Decoder/Driver
CD7211A
CMOS 4-Digit LCD Decoder/Driver
CD7211AM
CMOS 4-Digit LCD Decoder/Driver
CD7211M
CMOS 4-Digit LCD Decoder/Driver

CD4000/HC/HCT/AC/ACT Family (Continued)

MULTIVIBRATORS

CD4000

CD4047B
CMOS Low-Power Monostable/Astable Multivibrator
CD4098B
CMOS Dual Monostable Multivibrator
CD14538B
CMOS Dual Precision Monostable Multivibrator

HIGH-SPEED CMOS

HC/HCT123
Dual Retriggerable Monostable Multivibrator with Reset
HC/HCT221
Dual Monostable Multivibrator with Reset
HC/HCT423
Dual Retriggerable Monostable Multivibrator with Reset
HC/HCT4538
Dual Precision Monostable Multivibrator

PHASE-LOCKED LOOP

HIGH-SPEED CMOS

HC/HCT297
Digital Phase-Locker Loop Filter
HC/HCT4046A
Phase-Locked Loop with VCO
HC/HCT7046A
Phase-Locked Loop with In-Lock Detection

CD4000

CD4046B
Phase-Locked Loop

ADVANCED CMOS

AC/ACT297
Digital Phase-Locked Loop
AC/ACT4046 (Developmental)
High Speed Phase Locked Loop with VCO

SCHMITT TRIGGER

CD4000

CD4093B
CMOS Quad 2-Input NAND Schmitt Trigger
CD40106B
CMOS Hex Schmitt Trigger

HIGH-SPEED CMOS

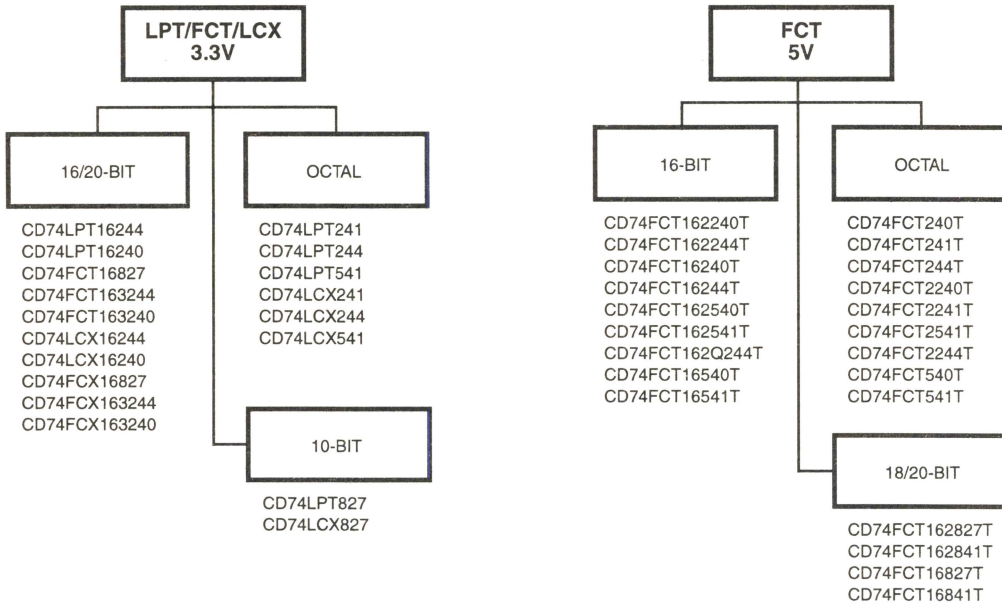
HC/HCT14
Hex Inverting Schmitt Trigger
HC/HCT132
Quad 2-Input NAND Schmitt Trigger

ADVANCED CMOS

AC/ACT14
Hex Inverting Schmitt Trigger

CMOS LPT/LCX/FCT Family

BUFFERS



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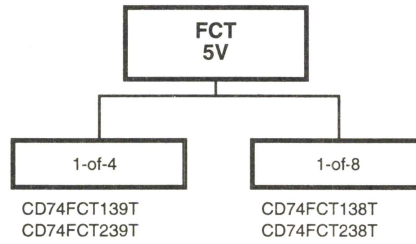
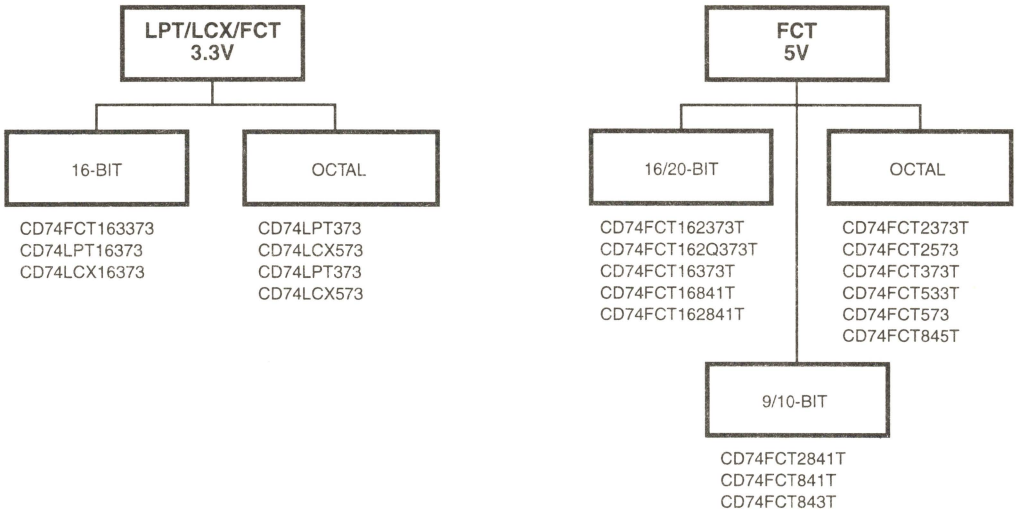
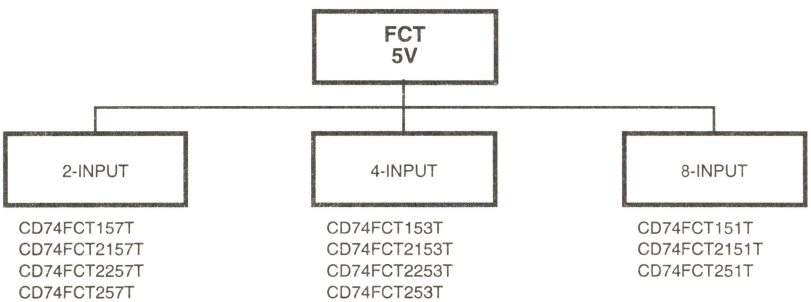


CMOS LPT/LCX/FCT Family (Continued)

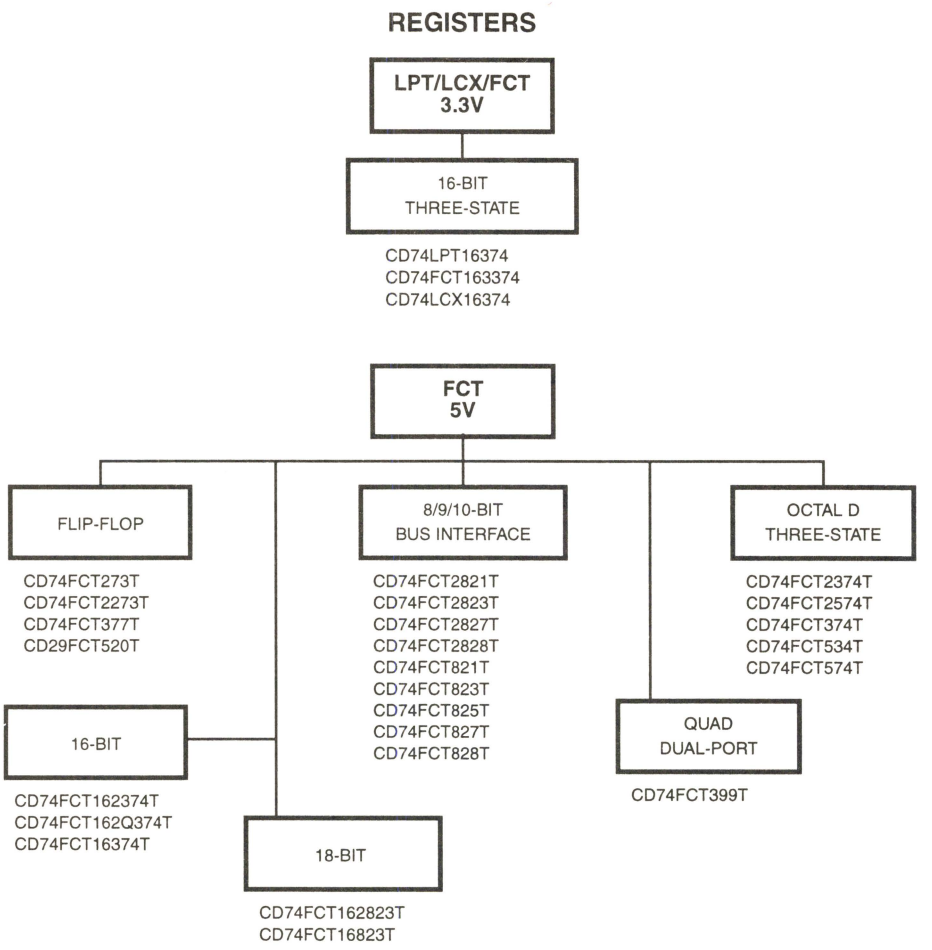
LATCHES



MULTIPLEXERS

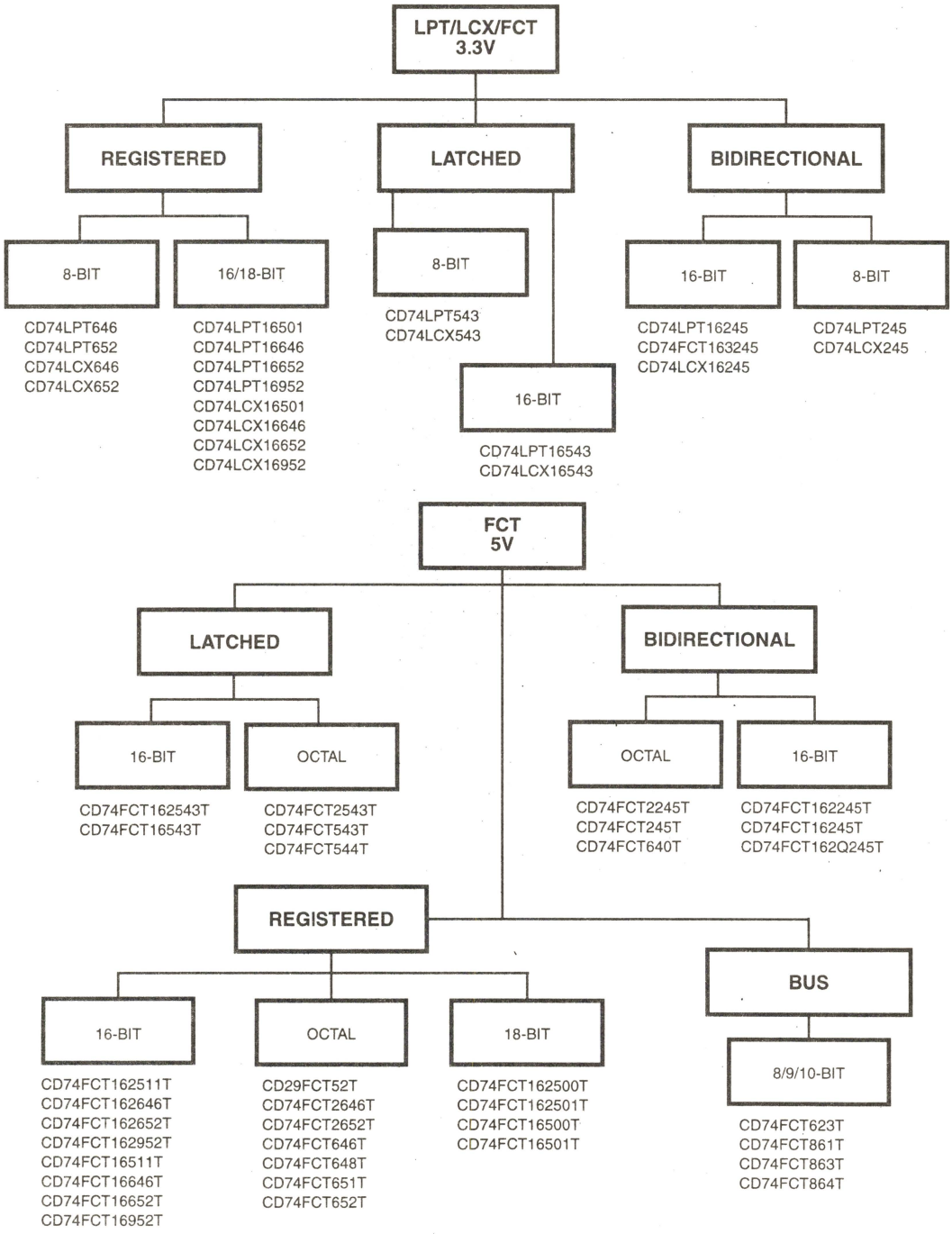


CMOS LPT/LCX/FCT Family (Continued)



CMOS LPT/LCX/FCT Family (Continued)

TRANSCEIVERS



BiCMOS 5V FCT Family

BUFFERS

FCT 5V

CD74FCT240
CD74FCT244
CD74FCT540
CD74FCT541

BUS TRANSCEIVERS

FCT 5V

CD74FCT245
CD74FCT543
CD74FCT646
CD74FCT651
CD74FCT652
CD74FCT653
CD74FCT654
CD74FCT861
CD74FCT863
CD74FCT864

FLIP-FLOP REGISTERS

FCT 5V

CD74FCT273
CD74FCT374
CD74FCT564
CD74FCT574
CD74FCT821
CD74FCT822
CD74FCT823
CD74FCT824

LATCHES

FCT 5V

CD74FCT373
CD74FCT573
CD74FCT841
CD74FCT842
CD74FCT843
CD74FCT844

3.3V LPT CMOS LOGIC WITH 5V TOLERANT I/O

PART NUMBER	DESCRIPTION	SPEED GRADE (X)				DOCUMENT NUMBER
		BLANK	A	B	C	
CD74LPT16240	Fast CMOS 3.3V 16-Bit Buffer/Line Driver	X	X			4215
CD74LPT16244	Fast CMOS 3.3V 16-Bit Buffer/Line Driver	X	X			4216
CD74LPT16245	Fast CMOS 3.3V 16-Bit Bidirectional Transceiver	X	X			4205
CD74LPT16373	Fast CMOS 3.3V 16-Bit Transparent Latch	X	X			4206
CD74LPT16374	Fast CMOS 3.3V 16-Bit Registers (Three-State)	X	X			4207
CD74LPT16501	Fast CMOS 18-Bit Registered Transceiver	X	X			4208
CD74LPT16543	Fast CMOS 16-Bit Latched Transceiver	X	X		X	4209
CD74LPT16646	Fast CMOS 3.3V 16-Bit Registered Transceiver	X	X			4210
CD74LPT16652	Fast CMOS 16-Bit Registered Transceiver	X	X			4211
CD74LPT16827	Fast CMOS 3.3V 20-Bit Buffer		X	X		4212
CD74LPT16952	Fast CMOS 3.3V 16-Bit Registered Transceiver		X	X		4213
CD74LPT241	Fast CMOS 3.3V 8-Bit Buffer/Line Driver	X	X		X	4196
CD74LPT244	Fast CMOS 3.3V 8-Bit Buffer/Line Driver	X	X		X	4197
CD74LPT245	Fast CMOS 3.3V 8-Bit Bidirectional Transceiver	X	X		X	4198
CD74LPT373	Fast CMOS 3.3V 8-Bit Transparent Latch	X	X		X	4199
CD74LPT541	Fast CMOS 3.3V 8-Bit Buffer/Line Driver	X	X		X	4200
CD74LPT543	Fast CMOS 3.3V 8-Bit Latched Transceiver	X	X		X	4256
CD74LPT573	Fast CMOS 3.3V 8-Bit Transparent Latches	X	X		X	4201
CD74LPT646	Fast CMOS 3.3V 8-Bit Registered Transceiver	X	X		X	4257
CD74LPT652	Fast CMOS 3.3V 8-Bit Registered Transceiver	X	X		X	4257
CD74LPT827	Fast CMOS 3.3V 10-Bit Buffer		X	X	X	4258

3.3V LCX CMOS LOGIC WITH 5V TOLERANT I/O

PART NUMBER	DESCRIPTION	STANDARD	DOCUMENT NUMBER
CD74LCX16240	Fast CMOS 3.3V 16-Bit Buffer/Line Driver	X	4432
CD74LCX16244	Fast CMOS 3.3V 16-Bit Buffer/Line Driver	X	4433
CD74LCX16245	Fast CMOS 3.3V 16-Bit Bidirectional Transceiver	X	4434
CD74LCX16373	Fast CMOS 3.3V 16-Bit Transparent Latch	X	4435
CD74LCX16374	Fast CMOS 3.3V 16-Bit Registers (Three-State)	X	4436
CD74LCX16501	Fast CMOS 18-Bit Registered Transceiver	X	4437
CD74LCX16543	Fast CMOS 16-Bit Latched Transceiver	X	4438
CD74LCX16646	Fast CMOS 3.3V 16-Bit Registered Transceiver	X	4439
CD74LCX16652	Fast CMOS 16-Bit Registered Transceiver	X	4440
CD74LCX16827	Fast CMOS 3.3V 20-Bit Buffer	X	4441
CD74LCX16952	Fast CMOS 3.3V 16-Bit Registered Transceiver	X	4442

NOTE: LCX is not speed graded.

OCTAL 5V FCT CMOS LOGIC AND 5V FCT WITH 25Ω SERIES RESISTOR

PART NUMBER	DESCRIPTION	SPEED GRADE (X)						DOCUMENT NUMBER
		BLANK	A	B	C	D	E	
CD29FCT520T	Fast CMOS Multilevel Pipeline Register	-	X	X	-	-	-	4164
CD29FCT52T	Fast CMOS Registered Transceivers	-	X	X	-	-	-	4163
CD74FCT138T	Fast CMOS 1-of-8 Decoder	X	X	-	X	-	-	4158
CD74FCT139T	Fast CMOS Dual 1-of-4 Decoder	X	X	-	X	-	-	4159
CD74FCT151T	8-Input Multiplexer	X	X	-	X	-	-	4160
CD74FCT153T	High-Speed CMOS Dual 4-Input Multiplexer	X	X	-	X	-	-	4161
CD74FCT157T	Fast CMOS Quad 2-Input Multiplexer	X	X	-	X	X	-	4166
CD74FCT2151T	Fast CMOS 8-Input Multiplexer	X	X	-	X	-	-	4160
CD74FCT2153T	High-Speed CMOS Dual 4-Input Multiplexer	X	X	-	X	-	-	4161
CD74FCT2157T	Fast CMOS Quad 2-Input Multiplexer	X	X	-	X	-	-	4166
CD74FCT2240T	Fast CMOS Octal Buffer and Line Drivers	X	X	-	X	-	-	4167
CD74FCT2241T	Octal Buffer and Line Drivers	X	X	-	X	-	-	4167
CD74FCT2244T	Fast CMOS Octal Buffer and Line Drivers	X	X	-	X	-	-	4167
CD74FCT2245T	Fast CMOS Octal Bidirectional Transceivers	X	X	-	X	X	-	4168
CD74FCT2253T	High-Speed CMOS Dual 4-Input Multiplexer	X	X	-	X	-	-	4161
CD74FCT2257T	Fast CMOS Quad 2-Input Multiplexer	X	X	-	X	-	-	4166
CD74FCT2273T	Fast CMOS Octal D Flip-Flop with Master Reset	X	X	-	X	-	-	4169
CD74FCT2373T	Fast CMOS Octal Transparent Latches	X	X	-	X	-	-	4170
CD74FCT2374T	Fast CMOS Octal D Registers (Three-State)	X	X	-	X	X	-	4171
CD74FCT238T	Fast CMOS 1-of-8 Decoder	X	X	-	X	-	-	4158
CD74FCT239T	Fast CMOS Dual 1-of-4 Decoder	X	X	-	X	-	-	4159
CD74FCT240T	Fast CMOS Octal Buffer and Line Drivers	X	X	-	X	X	-	4167
CD74FCT241T	Fast CMOS Octal Buffer and Line Drivers	X	X	-	X	X	-	4167
CD74FCT244T	Fast CMOS Octal Buffer and Line Drivers	X	X	-	X	X	-	4167
CD74FCT245T	Fast CMOS Octal Bidirectional Transceivers	X	X	-	X	X	-	4168
CD74FCT251T	Fast CMOS 8-Input Multiplexer	X	X	-	X	-	-	4160
CD74FCT253T	High-Speed CMOS Dual 4-Input Multiplexer	X	X	-	X	-	-	4161
CD74FCT2541T	Fast CMOS Octal Buffer and Line Drivers	X	X	-	X	-	-	4167
CD74FCT2543T	Fast CMOS Latched Transceivers	X	X	-	X	X	-	4173

OCTAL 5V FCT CMOS LOGIC AND 5V FCT WITH 25Ω SERIES RESISTOR (Continued)

PART NUMBER	DESCRIPTION	SPEED GRADE (X)						DOCUMENT NUMBER
		BLANK	A	B	C	D	E	
CD74FCT2573T	Fast CMOS Octal Transparent Latches	X	X	-	X	-	-	4170
CD74FCT2574T	Fast CMOS Octal D Registers (Three-State)	X	X	-	X	X	-	4171
CD74FCT257T	Fast CMOS Quad 2-Input Multiplexer	X	X	-	X	-	-	4166
CD74FCT2646T	Fast CMOS Octal Registered Transceivers	X	X	-	-	-	-	4175
CD74FCT2652T	Fast CMOS Octal Registered Transceivers	X	X	-	-	-	-	4175
CD74FCT273T	Fast CMOS Octal D Flip-Flop with Master Reset	X	X	-	X	X	-	4169
CD74FCT2821T	Fast CMOS Bus Interface Registers	-	X	X	-	-	-	4176
CD74FCT2823T	Fast CMOS Bus Interface Registers	-	X	X	X	-	-	4176
CD74FCT2827T	Fast CMOS 10-Bit Buffers	-	X	X	-	-	-	4179
CD74FCT2828T	Fast CMOS 10-Bit Buffers	-	X	X	X	-	-	4179
CD74FCT2841T	Fast CMOS Bus Interface Latches	-	X	X	X	-	-	4177
CD74FCT373T	Fast CMOS Octal Transparent Latches	X	X	-	X	X	-	4170
CD74FCT374T	Fast CMOS Octal D Registers (Three-State)	X	X	-	X	X	-	4171
CD74FCT377T	Fast CMOS Octal D Flip-Flop with Clock Enable	X	X	-	X	X	-	4172
CD74FCT399T	Fast CMOS Quad Dual-Port Register	X	X	-	X	-	-	4252
CD74FCT521T	Fast CMOS 8-Bit Identity Comparator	X	X	X	X	X	-	4214
CD74FCT533T	Fast CMOS Octal Transparent Latches	X	X	-	X	-	-	4170
CD74FCT534T	Fast CMOS Octal D Registers (Three-State)	X	X	-	X	X	-	4171
CD74FCT540T	Fast CMOS Octal Buffer and Line Drivers	X	X	-	X	X	-	4167
CD74FCT541T	Fast CMOS Octal Buffer and Line Drivers	X	X	-	X	X	-	4167
CD74FCT543T	Fast CMOS Latched Transceivers	X	X	-	X	X	-	4173
CD74FCT544T	Fast CMOS Latched Transceivers	X	X	-	X	X	-	4173
CD74FCT573T	Fast CMOS Octal Transparent Latches	X	X	-	X		-	4170
CD74FCT574T	Fast CMOS Octal D Registers (Three-State)	X	X	-	X	X	-	4171
CD74FCT623T	Fast CMOS Octal Bus Transceiver (Three-State)	X	X	-	X	X	-	4174
CD74FCT640T	Fast CMOS Octal Bidirectional Transceivers	X	X	-	X	X	-	4168
CD74FCT646T	Fast CMOS Octal Registered Transceivers	X	X	-	X	X	-	4175

OCTAL 5V FCT CMOS LOGIC AND 5V FCT WITH 25Ω SERIES RESISTOR (Continued)

PART NUMBER	DESCRIPTION	SPEED GRADE (X)						DOCUMENT NUMBER
		BLANK	A	B	C	D	E	
CD74FCT648T	Fast CMOS Octal Registered Transceivers	X	X	-	X	-	-	4175
CD74FCT651T CD74FCT2652T	Fast CMOS Octal Registered Transceivers	X	X	-	X	-	-	4175
CD74FCT652T	Fast CMOS Octal Registered Transceivers	X	X	-	X	-	-	4175
CD74FCT821T	Fast CMOS Bus Interface Registers	-	X	X	X	-	-	4176
CD74FCT823T	Fast CMOS Bus Interface Registers	-	X	X	X	-	-	4176
CD74FCT825T	Fast CMOS Bus Interface Registers	-	X	X	X	-	-	4176
CD74FCT827T	Fast CMOS 10-Bit Buffers	-	X	X	X	-	-	4179
CD74FCT828T	Fast CMOS 10-Bit Buffers	-	X	X	X	-	-	4179
CD74FCT841T	Fast CMOS Bus Interface Latches	-	X	X	X	-	-	4177
CD74FCT843T	Fast CMOS Bus Interface Latches	-	X	X	X	-	-	4177
CD74FCT845T	Fast CMOS Bus Interface Latches	-	X	X	X	-	-	4177
CD74FCT861T	Fast CMOS Bus Transceivers	-	X	X	X	-	-	4178
CD74FCT863T	Fast CMOS Bus Transceivers	-	X	X	X	-	-	4178
CD74FCT864T	Fast CMOS Bus Transceivers	-	X	X	X	-	-	4178

DOUBLE DENSITY 5V FCT CMOS LOGIC WITH BALANCED DRIVE

PART NUMBER	DESCRIPTION	SPEED GRADE (X)						DOCUMENT NUMBER
		BLANK	A	B	C	D	E	
CD74FCT162240T	Fast CMOS 16-Bit Buffer/Line Driver	X	X	-	X	X	X	4180
CD74FCT162244T	Fast CMOS 16-Bit Buffer/Line Driver	X	X	-	X	X	X	4181
CD74FCT162245T	Fast CMOS 16-Bit Bidirectional Transceiver	X	X	-	X	X	X	4217
CD74FCT162373T	Fast CMOS 16-Bit Transparent Latches	X	X	-	X	X	X	4182
CD74FCT162374T	Fast CMOS 16-Bit Register (Three-State)	X	X	-	X	X	X	4183
CD74FCT16240T	Fast CMOS 16-Bit Buffer/Line Driver	X	X	-	X	X	X	4180
CD74FCT16244T	Fast CMOS 16-Bit Buffer/Line Driver	X	X	-	X	X	X	4181
CD74FCT16245T	Fast CMOS 16-Bit Bidirectional Transceiver	X	X	-	X	X	X	4217
CD74FCT162500T	Fast CMOS 18-Bit Registered Transceiver	-	X	-	X	X	-	4202
CD74FCT162501T	Fast CMOS 18-Bit Registered Transceiver	-	X	-	X	X	X	4184
CD74FCT162511T	Fast CMOS 16-Bit Registered/Latched Transceiver with Parity	X	X	-	-	-	-	4218
CD74FCT162540T	Fast CMOS 16-Bit Buffer/Line Driver	X	X	-	X	X	X	4185
CD74FCT162541T	Fast CMOS 16-Bit Octal Buffer/Line Driver	X	X	-	X	X	X	4186
CD74FCT162543T	Fast CMOS 16-Bit Latched Transceiver	X	X	-	X	X	X	4187
CD74FCT162646T	Fast CMOS 16-Bit Registered Transceiver	X	X	-	X	X	X	4188

DOUBLE DENSITY 5V FCT CMOS LOGIC WITH BALANCED DRIVE (Continued)

PART NUMBER	DESCRIPTION	SPEED GRADE (X)						DOCUMENT NUMBER
		BLANK	A	B	C	D	E	
CD74FCT162652T	Fast CMOS 16-Bit Registered Transceiver	X	X	-	X	X	X	4203
CD74FCT162823T	Fast CMOS 18-Bit Register	-	X	X	X	X	X	4189
CD74FCT162827T	Fast CMOS 20-Bit Buffer	-	X	X	X	X	X	4190
CD74FCT162841T	Fast CMOS 20-Bit Transparent Latch	-	X	X	X	X	X	4204
CD74FCT162952T	Fast CMOS 16-Bit Registered Transceiver	-	X	-	X	X	X	4191
CD74FCT16373T	Fast CMOS 16-Bit Transparent Latch	X	X	-	X	X	X	4182
CD74FCT16374T	Fast CMOS 16-Bit Registers (Three-State)	X	X	-	X	X	X	4183
CD74FCT16500T	Fast CMOS 18-Bit Registered Transceiver	-	X	-	X	X	-	4202
CD74FCT16501T	Fast CMOS 18-Bit Registered Transceiver	-	X	-	X	X	X	4184
CD74FCT16511T	Fast CMOS 16-Bit Registered/Latched Transceiver with Parity	X	X	-	-	-	-	4218
CD74FCT16540T	Fast CMOS 16-Bit Buffer/Line Driver	X	X	-	X	-	-	4185
CD74FCT16541T	Fast CMOS 16-Bit Octal Buffer/Line Driver	X	X	-	X	X	X	4186
CD74FCT16543T	Fast CMOS 16-Bit Latched Transceiver	X	X	-	X	X	X	4187
CD74FCT16646T	Fast CMOS 16-Bit Registered Transceiver	X	X	-	X	X	X	4188
CD74FCT16652T	Fast CMOS 16-Bit Registered Transceiver	X	X	-	X	X	-	4203
CD74FCT16823T	Fast CMOS 18-Bit Register	-	X	X	X	X	X	4189
CD74FCT16827T	Fast CMOS 20-Bit Buffer	-	X	X	X	X	X	4190
CD74FCT16841T	Fast CMOS 20-Bit Transparent Latch	-	X	X	X	X	X	4204
CD74FCT16952T	Fast CMOS 16-Bit Registered Transceiver	-	X	-	X	X	X	4191
CD74FCT162H240T	Fast CMOS 16-Bit Buffer/Line Driver	X	X	-	X	X	X	4180
CD74FCT162H244T	Fast CMOS 16-Bit Buffer/Line Driver	X	X	-	X	X	X	4181
CD74FCT162H245T	Fast CMOS 16-Bit Directional Transceiver	X	X	-	X	X	X	4217
CD74FCT162H373T	Fast CMOS 16-Bit Transparent Latches	X	X	-	X	X	X	4182
CD74FCT162H374T	Fast CMOS 16-Bit Register (Three State)	X	X	-	X	X	X	4183
CD74FCT162H501T	Fast CMOS 18-Bit Register Transceiver	X	X	-	X	X	X	4184
CD74FCT162H540T	Fast CMOS 16-Bit Buffer/Line Driver	X	X	-	X	X	X	4185
CD74FCT162H541T	Fast CMOS 16-Bit Octal Buffer Line Driver	X	X	-	X	X	X	4186
CD74FCT162H543T	Fast CMOS 16-Bit Latched Transceiver	X	X	-	X	X	X	4187
CD74FCT162H646T	Fast CMOS 16-Bit Registered Transceiver	X	X	-	X	X	X	4188
CD74FCT162H823T	Fast CMOS 18-Bit Register	-	X	X	X	X	X	4189
CD74FCT162H827T	Fast CMOS 20-Bit Register Transceiver	-	X	X	X	X	X	4190
CD74FCT162H952T	Fast CMOS 16-Bit Register Transceiver	-	X	X	X	X	X	4191

DOUBLE DENSITY 5V FCT CMOS LOGIC QUIET SERIES

PART NUMBER	DESCRIPTION	SPEED GRADE (X)					DOCUMENT NUMBER
		BLANK	A	C	D	E	
CD74FCT162Q244T	Fast, Low Noise CMOS 16-Bit Buffer/Line Driver	X	X	X	X	X	4280
CD74FCT162Q245T	Fast CMOS 16-Bit Bidirectional Transceiver	X	X	X	X	X	4277
CD74FCT162Q373T	Fast CMOS 16-Bit Transparent Latch	X	X	X	X	X	4278
CD74FCT162Q374T	Fast CMOS 16-Bit Register (Three-State)	X	X	X	X	X	4279

3.3V FCT CMOS LOGIC

PART NUMBER	DESCRIPTION	SPEED GRADE (X)			DOCUMENT NUMBER
		BLANK	A	C	
CD74FCT163240	Fast CMOS 3.3V 16-Bit Octal Buffer/Line Driver	X	X	-	4255
CD74FCT163244	Fast CMOS 3.3V 16-Bit Buffer/Line Driver	X	X	X	4192
CD74FCT163245	Fast CMOS 3.3V 16-Bit Bidirectional Transceivers	X	X	X	4193
CD74FCT163373	Fast CMOS 3.3V 16-Bit Transparent Latch	X	X	X	4194
CD74FCT163374	Fast CMOS 3.3V 6-Bit Registers (Three-State)	X	X	X	4195

BiCMOS FCT LOGIC

PART NUMBER	DESCRIPTION	SPEED GRADE (X)		DOCUMENT NUMBER
		BLANK	A	
CD54FCT245	BiCMOS FCT Interface Logic Octal-Bus Transceiver, Three-State	X		2301
CD74FCT240	BiCMOS Interface Logic, Octal Buffer/Line Driver, Three-State	X		2227
CD74FCT240AT	BiCMOS FCT Interface Logic, Octal Buffer/Line Driver, Three-State		X	2227
CD74FCT244	BiCMOS FCT Interface Logic, Octal Buffer/Line Driver, Three-State			2227
CD74FCT244AT	BiCMOS FCT Interface Logic, Octal Buffer/Line Driver, Three-State		X	2227
CD74FCT245	BiCMOS FCT Interface Logic Octal-Bus Transceiver, Three-State	X		2301
CD74FCT273	BiCMOS FCT Interface Logic, Octal D Flip-Flop with Reset	X		2303
CD74FCT373	BiCMOS FCT Interface Logic Octal Transparent Latch, Three-State	X		2230
CD74FCT373AT	BiCMOS FCT Interface Logic Octal Transparent Latch, Three-State		X	2230
CD74FCT374	BiCMOS FCT Interface Logic, Octal D-Type Flip-Flop, Three-State	X		2305
CD74FCT540	BiCMOS FCT Interface Logic Octal Buffer/Line Driver, Three-State	X		2383
CD74FCT541	BiCMOS FCT Interface Logic Octal Buffer/Line Driver, Three-State	X		2383
CD74FCT543	BiCMOS FCT Interface Logic, Octal Register/Transceiver, Three-State	X		2399
CD74FCT564	BiCMOS FCT Interface Logic, Octal D-Type Flip-Flop, Three-State	X		2295
CD74FCT573	BiCMOS FCT Interface Logic Octal Transparent Latch, Three-State	X		2304
CD74FCT573AT	BiCMOS FCT Interface Logic Octal Transparent Latch, Three-State	X		2304
CD74FCT574	BiCMOS FCT Interface Logic, Octal D-Type Flip-Flop, Three-State	X		2295
CD74FCT646	BiCMOS FCT Interface Logic, Octal Bus Transceiver/Register, Three-State	X		2393

BiCMOS FCT LOGIC (Continued)

PART NUMBER	DESCRIPTION	SPEED GRADE (X)		DOCUMENT NUMBER
		BLANK	A	
CD74FCT651	BiCMOS FCT Interface Logic, Octal Bus Transceiver/Register, Three-State	X		2394
CD74FCT652	BiCMOS FCT Interface Logic, Octal Bus Transceiver/Register, Three-State	X		2394
CD74FCT653	BiCMOS FCT Interface Logic, Octal Bus Transceiver/Register, Open Drain (A Side), Three-State (B Side)	X		2403
CD74FCT654	BiCMOS FCT Interface Logic, Octal Bus Transceivers/Registers, Open Drain (A Side), Three-State (B Side)	X		2403
CD74FCT821A	BiCMOS FCT Interface Logic, 10-Bit D-Type Flip-Flops, Three-State		X	2390
CD74FCT822A	BiCMOS FCT Interface Logic, 10-Bit D-Type Flip-Flop, Three-State		X	2390
CD74FCT823A	BiCMOS FCT Interface Logic, 9-Bit D-Type Flip-Flop, Three-State		X	2389
CD74FCT824A	BiCMOS FCT Interface Logic, 9-Bit D-Type Flip-Flop, Three-State		X	2389
CD74FCT841A	BiCMOS FCT Interface Logic, 10-Bit Transparent Latch, Three-State		X	2397
CD74FCT842A	BiCMOS FCT Interface Logic, 10-Bit Transparent Latch, Three-State		X	2397
CD74FCT843A	BiCMOS FCT Interface Logic, 9-Bit Transparent Latch, Three-State		X	2396
CD74FCT844A	BiCMOS FCT Interface Logic, 9-Bit Transparent Latch, Three-State		X	2396
CD74FCT861A	BiCMOS FCT Interface Logic, 10-Bit Bus Transceiver, Three-State		X	2392
CD74FCT863A	BiCMOS FCT Interface Logic, 9-Bit Bus Transceiver, Three-State		XS	2391

HC/HCT SERIES

CMOS LOGIC		DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD54HC/HCT00	CD74HC/HCT00	Quad 2-Input NAND Gate	14	1464
CD54HC/HCT02	CD74HC/HCT02	Quad 2-Input NOR Gate	14	1647
CD54HC/HCT03	CD74HC/HCT03	Quad 2-Input NAND Gate with Open Drain	14	1832
CD54HC/HCT04	CD74HC/HCT04	Hex Inverter/Buffer	14	1471
CD54HC/HCT08	CD74HC/HCT08	Quad 2-Input AND Gate	14	1549
CD54HC/HCT10	CD74HC/HCT10	Triple 3-Input NAND Gate	14	1551
CD54HC/HCT11	CD74HC/HCT11	Triple 3-Input AND Gate	14	1475
CD54HC/HCT14	CD74HC/HCT14	Hex Inverting Schmitt Trigger	14	1781
CD54HC/HCT20	CD74HC/HCT20	Dual 4-Input NAND Gate	14	1601
CD54HC/HCT21	CD74HC/HCT21	Dual 4-Input AND Gate	14	1782
CD54HC/HCT27	CD74HC/HCT27	Triple 3-Input NOR Gate	14	1648
CD54HC/HCT30	CD74HC/HCT30	8-Input NAND Gate	14	1652
CD54HC/HCT32	CD74HC/HCT32	Quad 2-Input OR Gate	14	1643
CD54HC/HCT42	CD74HC/HCT42	BCD-to-Decimal Decoder (1-to-10)	16	1689
CD54HC/HCT73	CD74HC/HCT73	Dual J-K Flip-Flop with Reset	14	1721

HC/HCT SERIES (Continued)

CMOS LOGIC		DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD54HC/HCT74	CD74HC/HCT74	Dual D Flip-Flop with Set and Reset	14	1476
CD54HC/HCT75	CD74HC/HCT75	Dual 2-Bit Bistable Transparent Latch	16	1666
CD54HC/HCT85	CD74HC/HCT85	4-Bit Magnitude Comparator	16	1770
CD54HC/HCT86	CD74HC/HCT86	Quad 2-Input EXCLUSIVE-OR Gate	14	1644
CD54HC/HCT93	CD74HC/HCT93	4-Bit Binary Ripple Counter	14	1849
CD54HC/HCT107	CD74HC/HCT107	Dual J-K Flip-Flop with Reset	14	1722
CD54HC/HCT109	CD74HC/HCT109	Dual J-K Flip-Flop with Set and Reset	16	1667
CD54HC/HCT112	CD74HC/HCT112	Dual J-K Flip-Flop with Set and Reset	16	1843
CD54HC/HCT123	CD74HC/HCT123	Dual Retriggerable Monostable Multivibrator with Reset	16	1708
CD54HC/HCT125	CD74HC/HCT125	Quad Three-State Buffer	14	1771
CD54HC/HCT126	CD74HC/HCT126	Quad Three-State Buffer	14	1772
CD54HC/HCT132	CD74HC/HCT132	Quad 2-Input NAND Schmitt Trigger	14	1649
CD54HC/HCT137	CD74HC/HCT137	3-to-8-Line Decoder with Latch, Inverting	16	1886
CD54HC/HCT138	CD74HC/HCT138	3-to-8-Line Decoder/Demultiplexer, Inverting	16	1477
CD54HC/HCT139	CD74HC/HCT139	Dual 2-to-4-Line Decoder/Demultiplexer	16	1545
CD54HC/HCT147	CD74HC/HCT147	10-to-4-Line Priority Encoder	16	1773
CD54HC/HCT151	CD74HC/HCT151	8-Input Multiplexer	16	1645
CD54HC/HCT153	CD74HC/HCT153	Dual 4-Input Multiplexer	16	1774
CD54HC/HCT154	CD74HC/HCT154	4-to-16-Line Decoder/Demultiplexer	24	1657
CD54HC/HCT157	CD74HC/HCT157	Quad 2-Input Multiplexer	16	1642
CD54HC/HCT158	CD74HC/HCT158	Quad 2-Input Multiplexer, Inverting	16	1642
CD54HC/HCT160	CD74HC/HCT160	Synchronous BCD Decade Counter, Asynchronous Reset	16	1550
CD54HC/HCT161	CD74HC/HCT161	Synchronous 4-Bit Binary Counter, Asynchronous Reset	16	1550
CD54HC/HCT162	CD74HC/HCT162	Synchronous BCD Decade Counter, Synchronous Reset	16	1550
CD54HC/HCT163	CD74HC/HCT163	Synchronous 4-Bit Binary Counter, Synchronous Reset	16	1550
CD54HC/HCT164	CD74HC/HCT164	8-Bit Serial-In/Parallel-Out Shift Register	14	1658
CD54HC/HCT165	CD74HC/HCT165	8-Bit Parallel-In/Serial-Out Shift Register	16	1672
CD54HC/HCT166	CD74HC/HCT166	8-Bit Parallel-In/Serial-Out Shift Register	16	1501
CD54HC/HCT173	CD74HC/HCT173	Quad D Flip-Flop, Three-State	16	1641
CD54HC/HCT174	CD74HC/HCT174	Hex D-Type Flip-Flop with Reset	16	1608
CD54HC/HCT175	CD74HC/HCT175	Quad D-Type Flip-Flop with Reset	16	1474
CD54HC/HCT181	CD74HC/HCT181	4-Bit Arithmetic Logic Unit	24	1829
CD54HC/HCT190	CD74HC/HCT190	Presettable Synchronous BCD Decade Up/Down Counter	16	1662
CD54HC/HCT191	CD74HC/HCT191	Synchronous 4-Bit Binary Up/Down Counter	16	1662

HC/HCT SERIES (Continued)

CMOS LOGIC		DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD54HC/HCT192	CD74HC/HCT192	Synchronous BCD Decade Up/Down Counter	16	1674
CD54HC/HCT193	CD74HC/HCT193	Synchronous 4-Bit Binary Up/Down Counter	16	1674
CD54HC/HCT194	CD74HC/HCT194	4-Bit Bidirectional Universal Shift Register	16	1668
CD54HC/HCT195	CD74HC/HCT195	4-Bit Parallel Access Shift Register	16	1482
CD54HC/HCT221	CD74HC/HCT221	Dual Monostable Multivibrator with Reset	16	1670
CD54HC/HCT237	CD74HC/HCT237	3-to-8-Line Decoder/Demultiplexer with Address Latches	16	1886
CD54HC/HCT238	CD74HC/HCT238	3-to-8-Line Decoder/Demultiplexer	16	1477
CD54HC/HCT240	CD74HC/HCT240	Octal Buffer Line Driver, Three-State, Inverting	20	1656
CD54HC/HCT241	CD74HC/HCT241	Octal Buffer Line Driver, Three-State	20	1656
CD54HC/HCT242	CD74HC/HCT242	Quad-Bus Transceiver, Three-State, Inverting	14	1488
CD54HC/HCT243	CD74HC/HCT243	Quad-Bus Transceiver, Three-State	14	1488
CD54HC/HCT244	CD74HC/HCT244	Octal-Buffer Line Driver, Three-State	20	1656
CD54HC/HCT245	CD74HC/HCT245	Octal-Bus Transceiver, Three-State	20	1651
CD54HC/HCT251	CD74HC/HCT251	8-Input Multiplexer, Three-State	16	1489
CD54HC/HCT253	CD74HC/HCT253	Dual 4-Input Multiplexer, Three-State	16	1673
CD54HC/HCT257	CD74HC/HCT257	Quad 2-Input Multiplexer, Three-State; Non-Inverting Outputs	16	1650
CD54HC/HCT258	CD74HC/HCT258	Quad 2-Input Multiplexer, Three-State; Inverting Outputs	16	1775
CD54HC/HCT259	CD74HC/HCT259	8-Bit Addressable Latch	16	1727
CD54HC/HCT273	CD74HC/HCT273	Octal D-Type Flip-Flop with Reset	20	1479
CD54HC/HCT280	CD74HC/HCT280	9-Bit Odd/Even Parity Generator/Checker	14	1669
CD54HC/HCT283	CD74HC/HCT283	4-Bit Adder with Fast Carry	16	1848
CD54HC/HCT297	CD74HC/HCT297	Digital Phase-Locked Loop Filter	16	1852
CD54HC/HCT299	CD74HC/HCT299	8-Bit Universal Shift Register Three-State	20	1485
CD54HC/HCT354	CD74HC/HCT354	8-Input Multiplexer/Register, Three-State	20	1690
CD54HC/HCT356	CD74HC/HCT356	8-Input Multiplexer/Register, Three-State	20	1690
CD54HC/HCT365	CD74HC/HCT365	Hex Buffer/Line Driver, Three-State	16	1539
CD54HC/HCT366	CD74HC/HCT366	Hex Buffer/Line Driver, Three-State, Inverting	16	1539
CD54HC/HCT367	CD74HC/HCT367	Hex Buffer/Line Driver, Three-State	16	1538
CD54HC/HCT368	CD74HC/HCT368	Hex Buffer/Line Driver, Three-State, Inverting	16	1538
CD54HC/HCT373	CD74HC/HCT373	Octal Transparent Latch, Three-State	20	1679
CD54HC/HCT374	CD74HC/HCT374	Octal D Flip-Flop, Three-State	20	1663
CD54HC/HCT377	CD74HC/HCT377	Octal D-Type Flip-Flop with Data Enable	20	1675
CD54HC/HCT390	CD74HC/HCT390	Dual Decade Ripple Counter	16	1838
CD54HC/HCT393	CD74HC/HCT393	Dual 4-Bit Binary Ripple Counter	14	1653

HC/HCT SERIES (Continued)

CMOS LOGIC		DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD54HC/HCT423	CD74HC/HCT423	Dual Retriggerable Monostable Multivibrator with Reset	16	1708
CD54HC/HCT533	CD74HC/HCT533	Octal Transparent Latch, Three-State; Inverting	20	1599
CD54HC/HCT534	CD74HC/HCT534	Octal D Flip-Flop, Three-State, Inverting	20	1640
CD54HC/HCT540	CD74HC/HCT540	Octal Buffer Line Driver, Three-State, Inverting	20	1659
CD54HC/HCT541	CD74HC/HCT541	Octal Buffer Line Driver, Three-State	20	1659
CD54HC/HCT563	CD74HC/HCT563	Octal Transparent Latch, Three-State, Inverting	20	1599
CD54HC/HCT564	CD74HC/HCT564	Octal D Flip-Flop, Three-State, Inverting	20	1640
CD54HC/HCT573	CD74HC/HCT573	Octal Transparent Latch, Three-State	20	1679
CD54HC/HCT574	CD74HC/HCT574	Octal D Flip-Flop, Three-State	20	1663
CD54HC/HCT583	CD74HC/HCT583	4-Bit BCD Full Adder with Fast Carry	16	1828
CD54HC/HCT597	CD74HC/HCT597	8-Bit Shift Register with Input Storage	16	1915
CD54HC/HCT640	CD74HC/HCT640	Octal Bus Transceiver, Three-State, Inverting	20	1677
CD54HC/HCT643	CD74HC/HCT643	Octal Bus Transceiver, Three-State, True/Inverting	20	1677
CD54HC/HCT646	CD74HC/HCT646	Octal Bus Transceiver/Register, Three-State	24	1664
CD54HC/HCT648	CD74HC/HCT648	Octal Bus Transceiver/Register, Three-State, Inverting	24	1664
CD54HC/HCT651	CD74HC/HCT651	Octal Bus Transceiver/Register, Three-State, Inverting	24	2229
CD54HC/HCT652	CD74HC/HCT652	Octal Bus Transceiver/Register, Three-State, Non-Inverting	24	2229
CD54HC/HCT670	CD74HC/HCT670	4 x 4 Register File, Three-State	16	1660
CD54HC/HCT688	CD74HC/HCT688	8-Bit Magnitude Comparator	20	1646
CD54HC/HCT4002	CD74HC/HCT4002	Dual 4-Input NOR Gate	14	1776
CD54HC/HCT4015	CD74HC/HCT4015	Dual 4-Stage Static Shift Register	16	1678
CD54HC/HCT4016	CD74HC/HCT4016	Quad Bilateral Switch	14	1917
CD54HC/HCT4017	CD74HC/HCT4017	Decade Counter/Divider with 10 Decoded Outputs	16	1639
CD54HC/HCT4020	CD74HC/HCT4020	14-Stage Binary Ripple Counter	16	1484
CD54HC/HCT4024	CD74HC/HCT4024	7-Stage Binary Ripple Counter	16	1683
CD54HC/HCT4040	CD74HC/HCT4040	12-Bit Binary Counter	16	1483
CD54HC/HCT4046A	CD74HC/HCT4046A	Phase-Locked Loop with VCO	16	1854
CD54HC4049	CD74HC4049	Hex Inverting High-to-Low Level Shifter	16	1543
CD54HC4050	CD74HC4050	Hex High-to-Low Level Shifter	16	1543
CD54HC/HCT4051	CD74HC/HCT4051	8-Channel Analog Multiplexer/Demultiplexer	16	1676
CD54HC/HCT4052	CD74HC/HCT4052	Dual 4-Channel Analog Multiplexer/Demultiplexer	16	1676
CD54HC/HCT4053	CD74HC/HCT4053	Triple 2-Channel Analog Multiplexer/Demultiplexer	16	1676
CD54HC/HCT4059	CD74HC/HCT4059	Programmable Divide by "N" Counter	24	1853
CD54HC/HCT4060	CD74HC/HCT4060	14-Stage Binary Counter with Oscillator	16	1654

HC/HCT SERIES (Continued)

CMOS LOGIC		DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD54HC/HCT4066	CD74HC/HCT4066	Quad Bilateral Switch	14	1777
CD54HC/HCT4067	CD74HC/HCT4067	16-Channel Analog Multiplexer/Demultiplexer	24	1783
CD54HC/HCT4075	CD74HC/HCT4075	Triple 3-Input OR Gate	14	1778
CD54HC/HCT4094	CD74HC/HCT4094	8-Stage Shift-and-Store Bus Register	16	1779
CD54HC/HCT4316	CD74HC/HCT4316	Quad Analog Switch	16	1916
CD54HC/HCT4351	CD74HC/HCT4351	Analog MUX with Latch	20	2145
CD54HC/HCT4352	CD74HC/HCT4352	Analog MUX with Latch	20	2145
CD54HC/HCT4353	CD74HC/HCT4353	Analog MUX with Latch	20	2145
CD54HC/HCT4510	CD74HC/HCT4510	Up/Down Counter, BCD	16	1823
CD54HC/HCT4511	CD74HC/HCT4511	BCD-to-7-Segment Latch/Decoder/Driver	16	1786
CD54HC/HCT4514	CD74HC/HCT4514	4-to-16-Line Decoder/Demultiplexer with Input Latch	24	1597
CD54HC/HCT4515	CD74HC/HCT4515	4-to-16-Line Decoder with Input Latches	24	1597
CD54HC/HCT4516	CD74HC/HCT4516	Up/Down Counter, Binary	16	1823
CD54HC/HCT4518	CD74HC/HCT4518	Dual Synchronous BCD Counter	16	1665
CD54HC/HCT4520	CD74HC/HCT4520	Dual 4-Bit Synchronous Binary Counter	16	1665
CD54HC/HCT4538	CD74HC/HCT4538	Dual Precision Monostable Multivibrator	16	1671
CD54HC/HCT4543	CD74HC/HCT4543	BCD-to-7-Segment Latch Decoder/Driver for LCDs	16	1822
CD54HC/HCT7030	CD74HC/HCT7030	9-Bit x 64 Word FIFO Register, Three-State	28	2122
CD54HC/HCT7046A	CD74HC/HCT7046A	Phase-Locked Loop with In-Lock Detection	16	1920
CD54HC7266	CD74HC7266	Quad EXCLUSIVE-NOR Gate	14	1780
CD54HC/HCT40102	CD74HC/HCT40102	8-Bit Synchronous BCD Down Counter	16	1596
CD54HC/HCT40103	CD74HC/HCT40103	8-Bit Binary Down Counter	16	1596
CD54HC/HCT40104	CD74HC/HCT40104	4-Bit Bidirectional Universal Shift Register, Three-State	16	1661
CD54HC/HCT40105	CD74HC/HCT40105	4 Bits x 16 Words FIFO Register	16	1834
CD54HCU04	CD74HCU04	Hex Inverter (Unbuffered)	14	1655

AC/ACT SERIES

CMOS LOGIC		DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD54AC/ACT00	CD74AC/ACT00	Quad 2-Input NAND Gate	14	1855
CD54AC/ACT02	CD74AC/ACT02	Quad 2-Input NOR Gate	14	1978
CD54AC/ACT04	CD74AC/ACT04	Hex Inverter/Buffer	14	1945
CD54AC/ACT05	CD74AC/ACT05	Hex Inverter/Buffer with Open-Drain Outputs	14	1945
CD54AC/ACT08	CD74AC/ACT08	Quad 2-Input AND Gate	14	1950
CD54AC/ACT10	CD74AC/ACT10	Triple 3-Input NAND Gate	14	1977

AC/ACT SERIES (Continued)

CMOS LOGIC		DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD54AC/ACT14	CD74AC/ACT14	Hex Inverting Schmitt Trigger	14	1984
CD54AC/ACT20	CD74AC/ACT20	Dual 4-Input NAND Gate	14	1976
CD54AC/ACT32	CD74AC/ACT32	Quad 2-Input OR Gate	14	1951
CD54AC/ACT74	CD74AC/ACT74	Dual D Flip-Flop with Set and Reset	14	1881
CD54AC/ACT86	CD74AC/ACT86	Quad 2-Input Exclusive-OR Gate	14	1952
CD54AC/ACT109	CD74AC/ACT109	Dual J-K Flip-Flop with Set and Reset	16	1967
CD54AC/ACT112	CD74AC/ACT112	Dual J-K Flip-Flop with Set and Reset	16	1967
CD54AC/ACT138	CD74AC/ACT138	3-to-8-Line Decoder/Demultiplexer, Inverting	16	1909
CD54AC/ACT139	CD74AC/ACT139	Dual 2-to-4-Line Decoder/Demultiplexer	16	1953
CD54AC/ACT151	CD74AC/ACT151	8-Input Multiplexer	16	1980
CD54AC/ACT153	CD74AC/ACT153	Dual 4-Input Multiplexer	16	1966
CD54AC/ACT157	CD74AC/ACT157	Quad 2-Input Multiplexer	16	1910
CD54AC/ACT158	CD74AC/ACT158	Quad 2-Input Multiplexer, Inverting	16	1910
CD54AC/ACT161	CD74AC/ACT161	Synchronous 4-Bit Binary Counter, Asynchronous Reset	16	1959
CD54AC/ACT163	CD74AC/ACT163	Synchronous 4-Bit Binary Counter, Synchronous Reset	16	1959
CD54AC/ACT164	CD74AC/ACT164	8-Bit Serial-In/Parallel-Out Shift Register	14	1954
CD54AC/ACT174	CD74AC/ACT174	Hex D-Type Flip-Flop with Reset	16	1973
CD54AC/ACT175	CD74AC/ACT175	Quad D-Type Flip-Flop with Reset	16	1964
CD54AC/ACT191	CD74AC/ACT191	Synchronous 4-Bit Binary Up/Down Counter	16	1911
CD54AC/ACT193	CD74AC/ACT193	Synchronous 4-Bit Binary Up/Down Counter	16	1947
CD54AC/ACT238	CD74AC/ACT238	3-to-8-Line Decoder/Demultiplexer	16	1909
CD54AC/ACT240	CD74AC/ACT240	Octal Buffer/Line Driver, Three-State, Inverting	20	1856
CD54AC/ACT241	CD74AC/ACT241	Octal Buffer/Line Driver, Three-State	20	1856
CD54AC/ACT244	CD74AC/ACT244	Octal-Buffer/Line Driver, Three-State	20	1856
CD54AC/ACT245	CD74AC/ACT245	Octal-Bus Transceiver, Three-State	20	1907
CD54AC/ACT251	CD74AC/ACT251	8-Input Multiplexer, Three-State	16	1981
CD54AC/ACT253	CD74AC/ACT253	Dual 4-Input Multiplexer, Three-State	16	1985
CD54AC/ACT257	CD74AC/ACT257	Quad 2-Input Multiplexer, Three-State	16	1955
CD54AC/ACT258	CD74AC/ACT258	Quad 2-Input Multiplexer, Three-State	16	1955
CD54AC/ACT273	CD74AC/ACT273	Octal D-Type Flip-Flop with Reset	20	1979
CD54AC/ACT280	CD74AC/ACT280	8-Bit Odd/Even Parity Generator/Checker	14	1957
CD54AC/ACT283	CD74AC/ACT283	4-Bit Full Adder with Fast Carry	16	1912
CD54AC/ACT297	CD74AC/ACT297	Digital Phase-Locked Loop	16	2195
CD54AC/ACT299	CD74AC/ACT299	8-Bit Universal Shift Register, Three-State	20	1958

AC/ACT SERIES (Continued)

CMOS LOGIC		DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD54AC/ACT323	CD74AC/ACT323	8-Bit Universal Shift Register, Three-State, (with Synchronous Reset)	20	1958
CD54AC/ACT373	CD74AC/ACT373	Octal Transparent Latch, Three-State	20	1882
CD54AC/ACT374	CD74AC/ACT374	Octal D Flip-Flop, Three-State	20	1883
CD54AC/ACT533	CD74AC/ACT533	Octal Transparent Latch, Three-State, Inverting	20	1882
CD54AC/ACT534	CD74AC/ACT534	Octal D Flip-Flop, Three-State, Inverting	20	1883
CD54AC/ACT540	CD74AC/ACT540	Octal Buffer/Line Driver, Three-State, Inverting	20	1857
CD54AC/ACT541	CD74AC/ACT541	Octal Buffer/Line Driver, Three-State	20	1857
CD54AC/ACT563	CD74AC/ACT563	Octal Inverting Transparent Latch, Three-State	20	1956
CD54AC/ACT564	CD74AC/ACT564	Octal D-Type Flip-Flop, Three-State, Inverting	20	1948
CD54AC/ACT573	CD74AC/ACT573	Octal Transparent Latch, Three-State	20	1956
CD54AC/ACT574	CD74AC/ACT574	Octal D-Type Flip-Flop, Three-State	20	1948
CD54AC/ACT623	CD74AC/ACT623	Octal-Bus Transceiver, Three-State, Non-Inverting	20	1968
CD54AC/ACT646	CD74AC/ACT646	Octal-Bus Transceiver/Register, Three-State	24	1970
CD54AC/ACT647	CD74AC/ACT647	Octal-Bus Transceiver/Register with Open Drain, Non-Inverting	24	1982
CD54AC/ACT648	CD74AC/ACT648	Octal Bus Transceiver/Register, Three-State, Inverting	24	1970
CD54AC/ACT651	CD74AC/ACT651	Octal-Bus Transceiver/Register, Three-State, Inverting	24	1974
CD54AC/ACT652	CD74AC/ACT652	Octal-Bus, Transceiver/Register, Three-State, Non-Inverting	24	1974
CD54AC/ACT653	CD74AC/ACT653	Octal-Bus Transceiver/Register; Open-Drain (A-Side); Three-State (B Side); Inverting	24	1975
CD54AC/ACT654	CD74AC/ACT654	Octal-Bus Transceiver/Register; Open-Drain (A-Side); Three-State (B Side); Non-Inverting	24	1975
CD54AC/ACT7060	CD74AC/ACT7060	14-Stage Binary Counter with Oscillator	20	2062
CD54AC/ACT7623	CD74AC/ACT7623	Octal-Bus Transceiver/Register; Open-Drain (A-Side); Three-State (B Side); Non-Inverting	20	1969

CD4000 SERIES

CMOS LOGIC	DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD4001B	CMOS NOR Gate	14	985
CD4001UB	CMOS Quad 2-Input NOR Gate	14	945
CD4002B	CMOS NOR Gate	14	985
CD4006B	CMOS 18-Stage Static Shift Register	14	1033
CD4007UB	CMOS Dual Complementary Pair Plus Inverter	14	977
CD4008B	CMOS 4-Bit Full Adder	16	951
CD4009UB	CMOS Hex Buffer/Converter	16	940
CD4010B	CMOS Hex Buffer/Converter	16	940

CD4000 SERIES (Continued)

CMOS LOGIC	DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD4011B	CMOS NAND Gate	14	3718
CD4011UB	CMOS Quad 2-Input NAND Gate	14	947
CD4012B	CMOS NAND Gate	14	3718
CD4013B	CMOS Dual D-Type Flip-Flop	14	936
CD4014B	CMOS 8-Stage Static Shift Register	16	1043
CD4015B	CMOS Dual 4-Stage Static Shift Register	16	1024
CD4016B	CMOS Quad Bilateral Switch	14	953
CD4017B	CMOS Counter/Divider	16	1113
CD4018B	CMOS Presettable Divide-By-N Counter	16	1034
CD4019B	CMOS Quad AND/OR Select Gate	16	1045
CD4020B	CMOS Ripple-Carry Binary Counter/Divider (14 Stage)	16	1063
CD4021B	CMOS 8-Stage Static Shift Register	16	1043
CD4022B	CMOS Counter/Divider	16	1113
CD4023B	CMOS NAND Gate	14	3718
CD4024B	CMOS Ripple-Carry Binary Counter/Divider (7 Stage)	14	1063
CD4025B	CMOS NOR Gate	14	985
CD4026B	CMOS Decade Counter/Divider	16	1118
CD4027B	CMOS Dual J-K Master-Slave Flip-Flop	16	942
CD4028B	CMOS BCD-to-Decimal Decoder	16	1016
CD4029B	CMOS Presettable Up/Down Counter	16	1028
CD4030B	CMOS Quad Exclusive-OR Gate	14	1055
CD4031B	CMOS 64-Stage Static Shift Register	16	1073
CD4033B	CMOS Decade Counter/Divider	16	1118
CD4034B	CMOS 8-Stage Static Bidirectional Parallel/Serial Input/Output Bus Register	24	1062
CD4035B	CMOS 4-Stage Parallel-In/Parallel-Out Shift Register	16	1101
CD4040B	CMOS Ripple-Carry Binary Counter/Divider (12 Stage)	16	1063
CD4041UB	CMOS Quad True/Complement Buffer	14	934
CD4042B	CMOS Quad Clocked D Latch	16	954
CD4043B	CMOS Quad Three-State R/S Latch	16	956
CD4044B	CMOS Quad Three-State R/S Latch	16	956
CD4045B	CMOS 21-Stage Counter	16	1119
CD4046B	CMOS Micropower Phase-Locked Loop	16	1099
CD4047B	CMOS Low-Power Monostable/Astable Multivibrator	14	1123
CD4048B	CMOS Multifunction Expandable 8-Input Gate	16	1124
CD4049UB	CMOS Hex Buffer/Converter	16	926

CD4000 SERIES (Continued)

CMOS LOGIC	DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD4050B	CMOS Hex Buffer/Converter	16	926
CD4051B	CMOS Analog Multiplexer/Demultiplexer	16	902
CD4052B	CMOS Analog Multiplexer/Demultiplexer	16	902
CD4053B	CMOS Analog Multiplexer/Demultiplexer	16	902
CD4054B	CMOS Liquid-Crystal Display Driver	16	634
CD4055B	CMOS Liquid-Crystal Display Driver	16	634
CD4056B	CMOS Liquid-Crystal Display Driver	16	634
CD4059A	CMOS Programmable Divide-By-N Counter	24	898
CD4060B	CMOS 14-Stage Ripple-Carry Binary Counter/Divider and Oscillator	16	1120
CD4063B	CMOS 4-Bit Magnitude Comparator	16	805
CD4066B	CMOS Quad Bilateral Switch	14	1114
CD4067B	CMOS Analog Multiplexer/Demultiplexer	24	3719
CD4068B	CMOS 8-Input NAND/AND Gate	14	809
CD4069UB	CMOS Hex Inverter	14	804
CD4070B	CMOS Quad Exclusive-OR Gate	14	910
CD4071B	CMOS OR Gate	14	807
CD4072B	CMOS OR Gate	14	807
CD4073B	CMOS AND Gate	14	806
CD4075B	CMOS OR Gate	14	807
CD4076B	CMOS 4-Bit D-Type Register	16	903
CD4077B	CMOS Quad Exclusive-NOR Gate	14	910
CD4078B	CMOS 8-Input NOR/OR Gate	14	810
CD4081B	CMOS AND Gate	14	806
CD4082B	CMOS AND Gate	14	806
CD4085B	CMOS Dual 2-Wide AND-OR-INVERT Gate	14	811
CD4086B	CMOS Expandable 4-Wide 2-Input AND-OR-INVERT Gate	14	812
CD4089B	CMOS Binary Rate Multiplier	16	1003
CD4093B	CMOS Quad 2-Input NAND Schmitt Trigger	14	836
CD4094B	CMOS 8-Stage Shift-and-Store Bus Register	16	3707
CD4095B	CMOS Gated J-K Master-Slave Flip-Flop	14	879
CD4096B	CMOS Gated J-K Master-Slave Flip-Flop	14	879
CD4097B	CMOS Analog Multiplexer/Demultiplexer	24	3719
CD4098B	CMOS Dual Monostable Multivibrator	16	979
CD4099B	CMOS 8-Bit Addressable Latch	16	948
CD4502B	CMOS Strobed Hex Inverter/Buffer	16	1002

CD4000 SERIES (Continued)

CMOS LOGIC	DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD4503B	CMOS Hex Buffer	16	1224
CD4504B	CMOS Hex Voltage-Level Shifter for TTL-to-CMOS or CMOS-to-CMOS Operation	16	1846
CD4508B	CMOS Dual 4-Bit Latch	24	1009
CD4510B	CMOS Presettable Up/Down Counter	16	899
CD4511B	CMOS BCD-to-7-Segment Latch Decoder Driver	16	901
CD4512B	CMOS 8-Channel Data Selector	16	1032
CD4514B	CMOS 4-Bit Latch/4-to-16-Line Decoder	24	3721
CD4515B	CMOS 4-Bit Latch/4-to-16-Line Decoder	24	3721
CD4516B	CMOS Presettable Up/Down Counter	16	899
CD4517B	CMOS Dual 64-Stage Static Shift Register	16	1148
CD4518B	CMOS Dual Up Counter	16	808
CD4519B	CMOS 4-Bit AND/OR Selector, Quad 2-Channel Data Selector, or Quad Exclusive NOR Gate	16	1723
CD4520B	CMOS Dual Up Counter	16	808
CD4521B	CMOS 24-Stage Frequency Divider	16	1735
CD4522B	CMOS Programmable BCD Divide-By-N Counter	16	1710
CD4527B	CMOS BCD Rate Multiplier	16	1006
CD4529B	CMOS Dual 4-Channel Analog Data Selector	16	1720
CD4532B	CMOS 8-Bit Priority Encoder	16	876
CD4536B	CMOS Programmable Timer	16	1186
CD4541B	CMOS Programmable Timer	14	1378
CD4543B	CMOS BCD-to-7-Segment Latch/Decoder/Driver for Liquid-Crystal Display	16	1327
CD4555B	CMOS Dual Binary-to-1-to-4 Decoder/Demultiplexer	16	858
CD4556B	CMOS Dual Binary-to-1-to-4 Decoder/Demultiplexer	16	858
CD4560B	CMOS NBCD Adder	16	1711
CD4566B	CMOS Industrial Time-Based Generator	16	1728
CD4572UB	CMOS Hex Gate	16	1704
CD4585B	CMOS 4-Bit Magnitude Comparator	16	1146
CD4724B	CMOS 8-Bit Addressable Latch	16	1111
CD7211	CMOS 4-Digit LCD Decoder/Driver	40	1725
CD7211A	CMOS 4-Digit LCD Decoder/Driver	40	1725
CD7211AM	CMOS 4-Digit LCD Decoder/Driver	40	1726
CD7211M	CMOS 4-Digit LCD Decoder/Driver	40	1726
CD14538B	CMOS Dual Precision Monostable Multivibrator	16	3737
CD22402	CMOS LSI Sync Generator	24	1686
CD22777	CMOS 32kHz Quartz Analog Clock Circuit	8	1869

CD4000 SERIES (Continued)

CMOS LOGIC	DESCRIPTION	NUMBER OF LEADS	DOCUMENT NUMBER
CD40100B	CMOS 32-Stage Static Left/Right Shift Register	16	980
CD40102B	CMOS 8-Stage Presettable Synchronous Down Counter	16	984
CD40103B	CMOS 8-Stage Presettable Synchronous Down Counter	16	984
CD40105B	CMOS FIFO Register	16	1044
CD40106B	CMOS Hex Schmitt Trigger	14	1017
CD40107B	CMOS Dual 2-Input NAND Buffer/Driver	8, 14	1015
CD40109B	CMOS Quad Low-to-High Voltage Level Shifter	16	3722
CD40110B	CMOS Decade Up-Down Counter/Latch/Display Driver	16	1125
CD40116	CMOS High Speed 8-Bit Bidirectional CMOS/TTL Interfaced Level Converter	22	1234
CD40117B	Programmable Dual 4-Bit Terminator	14	1333
CD40147B	10-Line to 4-Line BCD Priority Encoder	16	1117
CD40160B	CMOS Synchronous Programmable 4-Bit Counter	16	1047
CD40161B	CMOS Synchronous Programmable 4-Bit Counter	16	1047
CD40163B	CMOS Synchronous Programmable 4-Bit Counter	16	1047
CD40174B	CMOS Hex D-Type Flip-Flop	16	1031
CD40175B	CMOS Quad D-Type Flip-Flop	16	1326
CD40192B	CMOS Presettable Up/Down Counter (Dual Clock with Reset)	16	993
CD40193B	CMOS Presettable Up/Down Counter (Dual Clock with Reset)	16	993
CD40194B	CMOS 4-Bit Bidirectional Universal Shift Register	16	1220
CD40257B	CMOS Quad 2-Line-to-1-Line Data Selector/Multiplexer	16	982

DC ELECTRICAL SPECIFICATIONS - HC SERIES For CD54HC/CD74HC Types

PARAMETER	SYMBOL	TEST CONDITIONS				V_{CC} (V)	CD54HC/CD74HC AMBIENT TEMPERATURE, T_A (°C)						UNIT
							25°C		-40°C TO 85°C		-55°C TO 125°C		
							MIN	MAX	MIN	MAX	MIN	MAX	
High Level Input Voltage	V_{IH} (Note 2)					2	1.5	-	1.5	-	1.5	-	V
						4.5	3.15	-	3.15	-	3.15	-	V
						6	4.2	-	4.2	-	4.2	-	V
Low Level Input Voltage	V_{IL} (Note 2)					2	-	0.5	-	0.5	-	0.5	V
						4.5	-	1.35	-	1.35	-	1.35	V
						6	-	1.8	-	1.8	-	1.8	V
		V_I	I_O										
			STD	BUS	UNIT								
High Level Output Voltage	V_{OH} (Note 3)	V_{IH} or V_{IL}	-20	-20	µA	2	1.9	-	1.9	-	1.9	-	V
			-20	-20	µA	4.5	4.4	-	4.4	-	4.4	-	V
			-20	-20	µA	6	5.9	-	5.9	-	5.9	-	V
			-4	-6	mA	4.5	3.98	-	3.84	-	3.7	-	V
			-5.2	-7.8	mA	6	5.48	-	5.34	-	5.2	-	V
Low Level Output Voltage	V_{OL}	V_{IH} or V_{IL}	20	20	µA	2	-	0.1	-	0.1	-	0.1	V
			20	20	µA	4.5	-	0.1	-	0.1	-	0.1	V
			20	20	µA	6	-	0.1	-	0.1	-	0.1	V
			4	6	mA	4.5	-	0.26	-	0.33	-	0.4	V
			5.2	7.8	mA	6	-	0.26	-	0.33	-	0.4	V
Input Leakage Current	I_I (Note 4)	$V_I = V_{CC}$ or GND				6	-	±0.1	-	±1.0	-	±1.0	µA
Three-State Output Off-State Current	I_{OZ} (Note 5)	$V_I = V_{IH}$ or V_{IL} $V_O = V_{CC}$ or GND				6	-	±0.5	-	±5	-	±10	µA
Quiescent Supply Current SSI	I_{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$				6	-	2	-	20	-	40	µA
Quiescent Supply Current FF						6	-	4	-	40	-	80	µA
Quiescent Supply Current MSI						6	-	8	-	80	-	160	µA

NOTES:

1. Unless otherwise specified, all voltages are referenced to Ground.
2. Except Schmitt trigger inputs.
3. Not applicable to open drain outputs.
4. For digital I/O pins use I_{OZ} limits.
5. Also applicable to open drain outputs.

DC ELECTRICAL SPECIFICATIONS - HCT SERIES For CD54HCT/CD74HCT Types

PARAMETER	SYMBOL	TEST CONDITIONS				V_{CC} (V)	CD54HCT/CD74HCT AMBIENT TEMPERATURE, T_A (°C)						UNIT
							25°C		-40°C TO 85°C		-55°C TO 125°C		
		V_I	I_O STD	I_O BUS	I_O UNIT		MIN	MAX	MIN	MAX	MIN	MAX	
High Level Input Voltage	V_{IH} (Note 5)					4.5 to 5.5	2.0	-	2.0	-	2.0	-	V
Low Level Input Voltage	V_{IL} (Note 5)					4.5 to 5.5	-	0.8	-	0.8	-	0.8	V
High Level Output Voltage	V_{OH} (Note 1)	V_{IH} or V_{IL}	-20	-20	µA	4.5	4.4	-	4.4	-	4.4	-	V
			-4	-6	mA	4.5	3.98	-	3.84	-	3.7	-	V
Low Level Output Voltage	V_{OL}	V_{IH} or V_{IL}	20	20	µA	4.5	-	0.1	-	0.1	-	0.1	V
			4	6	mA	4.5	-	0.26	-	0.33	-	0.4	V
Input Leakage Current	I_I (Note 2)	$V_I = V_{CC}$ or GND				5.5	-	±0.1	-	±1.0	-	±1.0	µA
Three-State Output Off-State Current	I_{OZ} (Note 3)	$V_I = V_{IH}$ or V_{IL} $V_O = V_{CC}$ or GND				5.5	-	±0.5	-	±5	-	±10	µA
Quiescent Supply Current SSI	I_{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$				5.5	-	2	-	20	-	40	µA
Quiescent Supply Current FF						5.5	-	4	-	40	-	80	µA
Quiescent Supply Current MSI						5.5	-	8	-	80	-	160	µA
Additional Quiescent Device Current Per Input Pin: 1 Unit Load (Note 4)	ΔI_{CC}	$V_I = V_{CC}$ -2.4V				4.5 to 5.5	-	360	-	450	-	490	µA

NOTES:

1. Not applicable to open drain outputs.
2. For digital I/O pins use I_{OZ} limits.
3. Also applicable to open drain outputs.
4. Total Supply Current = $I_{CC} + \Sigma\Delta I_{CC}$. Each type has a unit load factor table by input pin.
5. Except Schmitt Trigger inputs.

DC ELECTRICAL SPECIFICATIONS - AC SERIES

PARAMETER	SYMBOL	TEST CONDITIONS		V_{CC} (V)	AMBIENT TEMPERATURE, T_A (°C)						UNIT
					25°C		-40°C TO 85°C		-55°C TO 125°C		
		V_I (V)	I_O (mA)		MIN	MAX	MIN	MAX	MIN	MAX	
High-Level Input Voltage	V_{IH} (Note 9)			1.5	1.2	-	1.2	-	1.2	-	V
				3	2.1	-	2.1	-	2.1	-	V
				5.5	3.85	-	3.85	-	3.85	-	V

DC ELECTRICAL SPECIFICATIONS - AC SERIES (Continued)

PARAMETER	SYMBOL	TEST CONDITIONS		V_{CC} (V)	AMBIENT TEMPERATURE, T_A (°C)						UNIT
					25°C		-40°C TO 85°C		-55°C TO 125°C		
		V_I (V)	I_O (mA)		MIN	MAX	MIN	MAX	MIN	MAX	
Low-Level Input Voltage	V_{IL} (Note 9)			1.5	-	0.3	-	0.3	-	0.3	V
				3	-	0.9	-	0.9	-	0.9	V
				5.5	-	1.65	-	1.65	-	1.65	V
High-Level Output Voltage	V_{OH} (Note 8)	V_{IH} or V_{IL}	-0.05	1.5	1.4	-	1.4	-	1.4	-	V
			-0.05	3	2.9	-	2.9	-	2.9	-	V
			-0.05	4.5	4.4	-	4.4	-	4.4	-	V
			-4	3	2.58	-	2.48	-	2.4	-	V
			-24	4.5	3.94	-	3.8	-	3.7	-	V
			-75 (Notes 4, 5)	5.5	-	-	3.85	-	-	-	V
			-50 (Notes 4, 5)	5.5	-	-	-	-	3.85	-	V
Low-Level Output Voltage	V_{OL}	V_{IH} or V_{IL}	0.05	1.5	-	0.1	-	0.1	-	0.1	V
			0.05	3	-	0.1	-	0.1	-	0.1	V
			0.05	4.5	-	0.1	-	0.1	-	0.1	V
			12	3	-	0.36	-	0.44	-	0.5	V
			24	4.5	-	0.36	-	0.44	-	0.5	V
			75 (Notes 4, 5)	5.5	-	-	-	1.65	-	-	V
			50 (Notes 4, 5)	5.5	-	-	-	-	-	1.65	V
Input Leakage Current	I_I	V_{CC} or GND		5.5	-	±0.1	-	±1	-	±1	µA
Three-State Leakage Current (Note 6)	I_{OZ}	V_{IH} or V_{IL}, $V_O = V_{CC}$ or GND		5.5	-	±0.5	-	±5	-	±10	µA
Quiescent Supply Current, MSI (Note 7)	I_{CC}	V_{CC} or GND	0	5.5	-	8	-	80	-	160	µA

DC ELECTRICAL SPECIFICATIONS - ACT SERIES

PARAMETER	SYMBOL	TEST CONDITIONS		V_{CC} (V)	AMBIENT TEMPERATURE, T_A (°C)						UNIT
					25°C		-40°C TO 85°C		-55°C TO 125°C		
		V_I (V)	I_O (mA)		MIN	MAX	MIN	MAX	MIN	MAX	
High-Level Input Voltage	V_{IH} (Note 9)			4.5 to 5.5	2	-	2	-	2	-	V
Low-Level Input Voltage	V_{IL} (Note 9)			4.5 to 5.5	-	0.8	-	0.8	-	0.8	V
High-Level Output Voltage	V_{OH} (Note 8)	V_{IH} or V_{IL}	-0.05	4.5	4.4	-	4.4	-	4.4	-	V
			-24	4.5	3.94	-	3.8	-	3.7	-	V
			-75 (Notes 4, 5)	5.5	-	-	3.85	-	-	-	V
			-50 (Notes 4, 5)	5.5	-	-	-	-	3.85	-	V

DC ELECTRICAL SPECIFICATIONS - ACT SERIES (Continued)

PARAMETER	SYMBOL	TEST CONDITIONS		V_{CC} (V)	AMBIENT TEMPERATURE, T_A (°C)						UNIT
					25°C		-40°C TO 85°C		-55°C TO 125°C		
		V_I (V)	I_O (mA)		MIN	MAX	MIN	MAX	MIN	MAX	
Low-Level Output Voltage	V_{OL}	V_{IH} or V_{IL}	0.05	4.5	-	0.1	-	0.1	-	0.1	V
			24	4.5	-	0.36	-	0.44	-	0.5	V
			75 (Notes 4, 5)	5.5	-	-	-	1.65	-	-	V
			50 (Notes 4, 5)	5.5	-	-	-	-	-	1.65	V
Input Leakage Current	I_I	V_{CC} or GND		5.5	-	±0.1	-	±1	-	±1	µA
Three-State Leakage Current (Note 6)	I_{OZ}	V_{IH} or V_{IL}, $V_O = V_{CC}$ or GND		5.5	-	±0.5	-	±5	-	±10	µA
Quiescent Supply Current, MSI (Note 7)	I_{CC}	V_{CC} or GND	0	5.5	-	8	-	80	-	160	µA
Additional Supply Current per Input Pin, TTL Inputs High, 1 Unit Load	ΔI_{CC}	V_{CC} - 2.1		4.5 to 5.5	-	2.4	-	2.8	-	3	mA

NOTES:

1. Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.
2. For up to 4 outputs per device; add ±25mA for each additional output.
3. Unless otherwise specified, all voltages are referenced to ground.
4. Test one output at a time for a 1s maximum duration. Measurement is made by forcing current and measuring voltage to minimize power dissipation.
5. Test verifies a minimum 50Ω transmission-line-drive capability at 85°C, 75Ω at 125°C.
6. Three-State devices only (off-state leakage current for open-drain types).
7. SSI/FF limits are 4µA at 25°C, 40µA at 0°C to 70°C, -40°C to 85°C, 80µA at -55°C to 125°C.
8. Not applicable to open drain outputs.
9. Except Schmitt Trigger inputs.

DC ELECTRICAL SPECIFICATIONS - BiCMOS FCT SERIES

Commercial Temperature Range, 0°C to 70°C, V_{CC} = 4.75V Min to 5.25V Max

Extended Industrial and Military Temperature Range, -55°C to 125°C, V_{CC} = 4.5V Min to 5.5V Max

PARAMETER	SYMBOL	TEST CONDITIONS		V_{CC} (V)	25°C		0°C TO 70°C		-55°C TO 125°C		UNIT
		V_I (V)	I_O (mA)		MIN	MAX	MIN	MAX	MIN	MAX	
High Level Input Voltage	V_{IH}	-	-	4.5 to 5.5	2	-	2	-	2	-	V
Low Level Input Voltage	V_{IL}	-	-	4.5 to 5.5	-	0.8	-	0.8	-	0.8	V
High Level Output Voltage	V_{OH}	V_{IH} or V_{IL}	-15 (Note 4)	Min	2.4	-	2.4	-	-	-	V
			-12 (Note 4)	Min	2.4	-	-	-	2.4	-	V
Low Level Output Voltage	V_{OL}	V_{IH} or V_{IL}	64 (Note 4)	Min	-	0.55	-	0.55	-	-	V
			48 (Note 4)	Min	-	0.55	-	-	-	0.55	V

DC ELECTRICAL SPECIFICATIONS - BiCMOS FCT SERIES (Continued) Commercial Temperature Range, 0°C to 70°C, V_{CC} = 4.75V Min to 5.25V Max

Extended Industrial and Military Temperature Range, -55°C to 125°C, V_{CC} = 4.5V Min to 5.5V Max

PARAMETER	SYMBOL	TEST CONDITIONS		V_{CC} (V)	25°C		0°C TO 70°C		-55°C TO 125°C		UNIT
		V_I (V)	I_O (mA)		MIN	MAX	MIN	MAX	MIN	MAX	
High Level Input Current	I_{IH}	V_{CC}	-	Max	-	0.1	-	1	-	1	µA
Low Level Input Current	I_{IL}	GND	-	Max	-	-0.1	-	-1	-	-1	µA
Three-State Leakage Current	I_{OZH}	V_{CC}	-	Max	-	0.5	-	10	-	10	µA
	I_{OZL}	GND	-	Max	-	-0.5	-	-10	-	-10	µA
Short Circuit Output Current (Note 2)	I_{OS}	V_{CC} or GND V_O = 0	-	Max	-60 (Note 4)	-	-60 (Note 4)	-	60 (Note 4)	-	mA
Input Clamp Voltage	V_{IK}	V_{CC} or GND	-18	Min	-	-1.2	-	-1.2	-	-1.2	V
Quiescent Supply Current	I_{CC}	V_{CC} or GND	0	Max	-	8	-	80	-	500	µA
Additional Quiescent Supply Current per Input Pin, TTL Inputs High, 1 Unit Load	ΔI_{CC}	3.4 (Note 3)	-	Max	-	1.6	-	1.6	-	2	mA

NOTES:

1. Unless otherwise specified, all voltages are referenced to GND.
2. Not more than one output should be shorted at one time. Test duration should not exceed 100ms.
3. Inputs that are not measured are at V_{CC} or GND. FCT Input Loading: All inputs are 1 unit load. Unit load is ΔI_{CC} limit specified in DC Electrical Specifications Chart, e.g., 1.6mA Max at 70°C.
4. Values are for FCT240 types (See Table 4 for I_{OL} and I_{OH} for other types).

ELECTRICAL SPECIFICATIONS - OCTAL 5V CMOS FCT SERIES

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
DC ELECTRICAL SPECIFICATIONS Over the Operating Range, T_A = -40°C to 85°C, V_{CC} = 5.0V ±5%							
Output HIGH Voltage	V_{OH}	V_{CC} = Min, V_{IN} = V_{IH} or V_{IL}	I_{OH} = -15.0mA	2.4	3.0	-	V
Output LOW Voltage	V_{OL}	V_{CC} = Min, V_{IN} = V_{IH} or V_{IL}	I_{OL} = 48mA	-	0.3	0.50	V
Output LOW Voltage	V_{OL}	V_{CC} = Min, V_{IN} = V_{IH} or V_{IL}	I_{OL} = 12mA (25Ω series)	-	0.3	0.50	V
Input HIGH Voltage	V_{IH}	Guaranteed Logic HIGH Level		2.0	-	-	V
Input LOW Voltage	V_{IL}	Guaranteed Logic LOW Level		-	-	0.8	V
Input HIGH Current	I_{IH}	V_{CC} = Max	V_{IN} = V_{CC}	-	-	1	µA
Input LOW Current	I_{IL}	V_{CC} = Max	V_{IN} = GND	-	-	-1	µA
High Impedance Output Current	I_{OZH}, I_{OZL}	V_{CC} = Max	V_{OUT} = 2.7V	-	-	1	µA
			V_{OUT} = 0.5V	-	-	-1	µA
Clamp Diode Voltage	V_{IK}	V_{CC} = Min, I_{IN} = -18mA		-	-0.7	-1.2	V
Short Circuit Current	I_{OS}	V_{CC} = Max (Note 2), V_{OUT} = GND		-60	-120	-	mA
Power Down Disable	I_{OFF}	V_{CC} = GND, V_{OUT} = 4.5V		-	-	100	µA

ELECTRICAL SPECIFICATIONS - OCTAL 5V CMOS FCT SERIES (Continued)

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
Input Hysteresis	V_H			-	200	-	mV
CAPACITANCE $T_A = 25^oC$, f = 1MHz							
Input Capacitance (Note 3)	C_{IN}	V_{IN} = 0V		-	6	10	pF
Output Capacitance (Note 3)	C_{OUT}	V_{OUT} = 0V		-	8	12	pF
POWER SUPPLY SPECIFICATIONS							
Quiescent Power Supply Current	I_{CC}	V_{CC} = Max	V_{IN} = GND or V_{CC}	-	0.1	500	µA
Supply Current per Input at TTL HIGH	ΔI_{CC}	V_{CC} = Max	V_{IN} = 3.4V (Note 4)	-	0.5	2.5	mA
Supply Current per Input per MHz (Note 6)	I_{CCD}	V_{CC} = Max, Outputs Open $\overline{E}$ or $\overline{OE}$ = GND One Bit Toggling 50% Duty Cycle	$V_{IN} = V_{CC}$ V_{IN} = GND	-	0.15	0.25	mA/ MHz
Total Power Supply Current (Note7)	I_C	V_{CC} = Max, Outputs Open f_i = 10MHz, 50% Duty Cycle $\overline{E}$ or $\overline{OE}$ = GND One Bit Toggling	$V_{IN} = V_{CC}$ V_{IN} = GND	-	1.5	3.5 (Note 6)	mA
			V_{IN} = 3.4V V_{IN} = GND	-	1.8	4.5 (Note 6)	

NOTES:

1. Typical values are at V_{CC} = 5.0V, 25°C ambient and maximum loading.
2. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
3. This parameter is determined by device characterization but is not production tested.
4. Per TTL driven input (V_{IN} = 3.4V); all other inputs at V_{CC} or GND.
5. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
6. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.
7. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_i N_i)$
   I_{CC} = Quiescent Current
   ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)
   D_H = Duty Cycle for TTL Inputs High
   N_T = Number of TTL Inputs at D_H
   I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
   f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)
   f_i = Input Frequency
   N_i = Number of Inputs at f_i
   All currents are in milliamps and all frequencies are in megahertz.
   Values are for CD74FCT240T.

ELECTRICAL SPECIFICATIONS - DOUBLE DENSITY 5V CMOS FCT AND FCT WITH BUS HOLD SERIES

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS	MIN	(NOTE 2) TYP	MAX	UNITS
DC ELECTRICAL SPECIFICATIONS Over the Operating Range, $T_A = -40^oC$ to 85^oC, V_{CC} = 5.0V ±10%						
Input HIGH Voltage	V_{IH}	Guaranteed Logic HIGH Level	2.0	-	-	V
Input LOW Voltage	V_{IL}	Guaranteed Logic LOW Level	-	-	0.8	V

ELECTRICAL SPECIFICATIONS - DOUBLE DENSITY 5V CMOS FCT AND FCT WITH BUS HOLD SERIES (Continued)

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
Input HIGH Current	I_{IH}	Standard Input (Note 4) V_{CC} = Max	$V_{IN} = V_{CC}$	-	-	1	µA
Input HIGH Current	I_{IH}	Standard I/O (Note 4) V_{CC} = Max	$V_{IN} = V_{CC}$	-	-	1	µA
Input HIGH Current	I_{IH}	Bus Hold Input (Note 5) V_{CC} = Max	$V_{IN} = V_{CC}$	-	-	±100	µA
Input HIGH Current	I_{IH}	Bus Hold I/O (Note 5) V_{CC} = Max	$V_{IN} = V_{CC}$	-	-	±100	µA
Input LOW Current	I_{IL}	Standard Input (Note 4) V_{CC} = Min	V_{IN} = GND	-	-	-1	µA
Input LOW Current	I_{IL}	Standard I/O (Note 4) V_{CC} = Min	V_{IN} = GND	-	-	-1	µA
Input LOW Current	I_{IL}	Bus Hold Input (Note 5) V_{CC} = Min	V_{IN} = GND	-	-	±100	µA
Input LOW Current	I_{IL}	Bus Hold I/O (Note 5) V_{CC} = Min	V_{IN} = GND	-	-	±100	µA
Bus Hold Sustain Current	I_{BHH}	Bus Hold Input (Note 5) V_{CC} = Min	V_{IN} = 2.0V	-50	-	-	µA
	I_{BHL}		V_{IN} = 0.8V	50	-	-	µA
High Impedance Output Current (Three-State) (Note 6)	I_{OZH}	V_{CC} = Max	V_{OUT} = 2.7V	-	-	1	µA
	I_{OZL}	V_{CC} = Max	V_{OUT} = 0.5V	-	-	-1	µA
Clamp Diode Voltage	V_{IK}	V_{CC} = Min, I_{IN} = -18mA		-	-0.7	-1.2	V
Short Circuit Current	I_{OS}	V_{CC} = Max (Note 6), V_{OUT} = GND		-80	-140	-200	mA
Output Drive Current	I_O	V_{CC} = Max (Note 6), V_{OUT} = 2.5V		-50	-	-180	mA
Input Hysteresis	V_H			-	100	-	mV
OUTPUT DRIVE SPECIFICATIONS Over the Operating Range							
Output HIGH Voltage	V_{OH}	V_{CC} = Min, $V_{IN} = V_{IH}$ or V_{IL}	I_{OH} = -3.0mA	2.5	3.5	-	V
			I_{OH} = -15.0mA	2.4	3.5	-	V
			I_{OH} = -32.0mA	2.0	3.0	-	V
Output LOW Voltage	V_{OL}	V_{CC} = Min, $V_{IN} = V_{IH}$ or V_{IL}	I_{OL} = 64mA	-	0.2	0.55	V
Power Down Disable	I_{OFF}	V_{CC} = 0V, V_{IN} or $V_{OUT} \leq$ 4.5V		-	-	100	µ A
OUTPUT BALANCED DRIVE SPECIFICATIONS Over the Operating Range							
Output HIGH Voltage	V_{OH}	V_{CC} = Min, $V_{IN} = V_{IH}$ or V_{IL}	I_{OH} = -24.0mA	2.4	3.3	-	V
Output LOW Voltage	V_{OL}	V_{CC} = Min, $V_{IN} = V_{IH}$ or V_{IL}	I_{OL} = 24mA	-	0.3	0.55	V
Output LOW Current	I_{ODL}	V_{CC} = 5V, $V_{IN} = V_{IH}$ or V_{IL}, V_{OUT} = 1.5V (Note 3)		60	115	150	mA
Output HIGH Current	I_{ODH}	V_{CC} = 5V, $V_{IN} = V_{IH}$ or V_{IL}, V_{OUT} = 1.5V (Note 3)		-60	-115	-150	mA
CAPACITANCE T_A = 25°C, f = 1MHz							
Input Capacitance (Note 7)	C_{IN}	V_{IN} = 0V		-	4.5	6	pF

ELECTRICAL SPECIFICATIONS - DOUBLE DENSITY 5V CMOS FCT AND FCT WITH BUS HOLD SERIES (Continued)

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
Output Capacitance (Note 7)	C_{OUT}	V_{OUT} = 0V		-	5.5	8	pF
POWER SUPPLY SPECIFICATIONS (CD74FCT1620T, CD74FCT162240T)							
Quiescent Power Supply Current	I_{CC}	V_{CC} = Max	V_{IN} = GND or V_{CC}	-	0.1	500	µA
Supply Current per Input at TTL HIGH	ΔI_{CC}	V_{CC} = Max	V_{IN} = 3.4V (Note 8)	-	0.5	1.5	mA
Supply Current per Input per MHz (Note 9)	I_{CCD}	V_{CC} = Max, Outputs Open $_x\overline{OE}$ = GND One Bit Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND	-	60	100	µA/ MHz
Total Power Supply Current (Note 11)	I_C	V_{CC} = Max, Outputs Open f_i = 10MHz, 50% Duty Cycle $_x\overline{OE}$ = GND One Bit Toggling	V_{IN} = V_{CC} V_{IN} = GND	-	0.6	1.5 (Note 10)	mA
			V_{IN} = 3.4V V_{IN} = GND	-	0.9	2.3 (Note 10)	mA
		V_{CC} = Max, Outputs Open f_i = 2.5MHz 50% Duty Cycle $_x\overline{OE}$ = GND 16 Bits Toggling	V_{IN} = V_{CC} V_{IN} = GND	-	2.4	4.5 (Note 10)	mA
			1. V_{IN} = 3.4V V_{IN} = GND	-	6.4	16.5 (Note 10)	mA

NOTES:

1. For conditions shown as Max or Min, use appropriate value specified under Electrical Specifications for the applicable device type.
2. Typical values are at V_{CC} = 5.0V, 25°C ambient and maximum loading, except as noted.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. The test limit for this parameter is ±5µA at T_A = -55°C.
5. Pins with Bus Hold are identified in the pin description.
6. This specification does not apply to bidirectional functionalities with Bus Hold.
7. This parameter is determined by device characterization but is not production tested.
8. Per TTL driven input (V_{IN} = 3.4V); all other inputs at V_{CC} or GND.
9. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
10. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.
11. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
    $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_i N_i)$
    I_{CC} = Quiescent Current
    ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)
    D_H = Duty Cycle for TTL Inputs High
    N_T = Number of TTL Inputs at D_H
    I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
    f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)
    f_i = Input Frequency
    N_i = Number of Inputs at f_i
    All currents are in milliamps and all frequencies are in megahertz.

ELECTRICAL SPECIFICATIONS - DOUBLE DENSITY 5V CMOS FCT - QUIET SERIES

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
DC ELECTRICAL SPECIFICATIONS Over the Operating Range, T_A = -40°C to 85°C, V_{CC} = 5.0V ±10%							
Input HIGH Voltage	V_{IH}	Guaranteed Logic HIGH Level		2.0	-	-	V
Input LOW Voltage	V_{IL}	Guaranteed Logic LOW Level		-	-	0.8	V
Input HIGH Current	I_{IH}	Standard Input V_{CC} = Max	$V_{IN} = V_{CC}$	-	-	1	µA
Input HIGH Current	I_{IH}	Bus Hold Input (Note 4) V_{CC} = Max	$V_{IN} = V_{CC}$	-	-	±100	µA
Input LOW Current	I_{IL}	Standard Input V_{CC} = Min	V_{IN} = GND	-	-	-1	µA
Input LOW Current	I_{IL}	Bus Hold Input (Note 4) V_{CC} = Min	V_{IN} = GND	-	-	±100	µA
Bus Hold Sustain Current	I_{BHH} I_{BHL}	Bus Hold Input (Note 4) V_{CC} = Min	V_{IN} = 2.0V	-50	-	-	µA
			V_{IN} = 0.8V	50	-	-	µA
High Impedance Output Current (Three-State) (Note 5)	I_{OZH}	V_{CC} = Max	V_{OUT} = 2.7V	-	-	1	µA
	I_{OZL}	V_{CC} = Max	V_{OUT} = 0.5V	-	-	-1	µA
Clamp Diode Voltage	V_{IK}	V_{CC} = Min, I_{IN} = -18mA		-	-0.7	-1.2	V
Output Drive Current	I_O	V_{CC} = Max (Note 3), V_{OUT} = 2.5V		-50	-	-180	mA
Input Hysteresis	V_H			-	100	-	mV
OUTPUT DRIVE SPECIFICATIONS Over the Operating Range							
Output LOW Current	I_{ODL}	V_{CC} = 5V, $V_{IN} = V_{IH}$ or V_{IL}, V_{OUT} = 1.5V (Note 3)		36	-	-	mA
Output HIGH Current	I_{ODH}	V_{CC} = 5V, $V_{IN} = V_{IH}$ or V_{IL}, V_{OUT} = 1.5V (Note 3)		-100	-166	-200	mA
Output HIGH Voltage	V_{OH}	V_{CC} = Min, $V_{IN} = V_{IH}$ or V_{IL}	I_{OH} = -12.0mA	2.4	3.3	-	V
Output LOW Voltage	V_{OL}	V_{CC} = Min, $V_{IN} = V_{IH}$ or V_{IL}	I_{OL} = 12mA	-	0.4	0.55	V
CAPACITANCE T_A = 25°C, f = 1MHz							
Input Capacitance (Note 6)	C_{IN}	V_{IN} = 0V		-	4.5	6	pF
Output Capacitance (Note 6)	C_{OUT}	V_{OUT} = 0V		-	5.5	8	pF
POWER SUPPLY SPECIFICATIONS							
Quiescent Power Supply Current	I_{CC}	V_{CC} = Max	V_{IN} = GND or V_{CC}	-	0.1	500	µA
Supply Current per Input at TTL HIGH	ΔI_{CC}	V_{CC} = Max	V_{IN} = 3.4V (Note 7)	-	0.5	1.5	mA
Supply Current per Input per MHz (Note 8)	I_{CCD}	V_{CC} = Max, Outputs Open $_x\overline{OE}$ = GND, $_x$LE = V_{CC} One Bit Toggling 50% Duty Cycle	$V_{IN} = V_{CC}$ V_{IN} = GND	-	60	100	µA/ MHz

ELECTRICAL SPECIFICATIONS - DOUBLE DENSITY 5V CMOS FCT - QUIET SERIES (Continued)

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
Total Power Supply Current (Note 10)	I_C	V_{CC} = Max, Outputs Open f_i = 10MHz, 50% Duty Cycle $_x\overline{OE}$ = GND, $_x$LE = V_{CC} One Bit Toggling	$V_{IN} = V_{CC}$ V_{IN} = GND	-	0.6	1.5 (Note 9)	mA
			V_{IN} = 3.4V V_{IN} = GND	-	0.9	2.3 (Note 9)	mA
		V_{CC} = Max, Outputs Open f_i = 2.5MHz 50% Duty Cycle $_x\overline{OE}$ = GND, $_x$LE = V_{CC} 16 Bits Toggling	$V_{IN} = V_{CC}$ V_{IN} = GND	-	2.5	5.5 (Note 9)	mA
			V_{IN} = 3.4V V_{IN} = GND	-	6.4	16.5 (Note 9)	mA

NOTES:

1. For conditions shown as Max or Min, use appropriate value specified under Electrical Specifications for the applicable device type.
2. Typical values are at V_{CC} = 5.0V, 25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. Pins with Bus Hold are identified in the pin description.
5. This specification does not apply to bi-directional functionalities with Bus Hold.
6. This parameter is determined by device characterization but is not production tested.
7. Per TTL driven input (V_{IN} = 3.4V); all other inputs at V_{CC} or GND.
8. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
9. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested
10. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
    $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_i N_i)$
    I_{CC} = Quiescent Current
    ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)
    D_H = Duty Cycle for TTL Inputs High
    N_T = Number of TTL Inputs at D
    I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
    f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)
    f_i = Input Frequency
    N_i = Number of Inputs at f_i
    All currents are in milliamps and all frequencies are in megahertz.
    Values are for CD74FCT162Q244T.

ELECTRICAL SPECIFICATIONS - DOUBLE DENSITY 3.3V CMOS FCT SERIES

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
DC ELECTRICAL SPECIFICATIONS Over the Operating Range, T_A = -40°C to 85°C, V_{CC} = 2.7V to 3.6V							
Input HIGH Voltage (Input Pins)	V_{IH}	Guaranteed Logic HIGH Level		2.2	-	5.5	V
Input HIGH Voltage (I/O Pins)	V_{IH}	Guaranteed Logic HIGH Level		2.0	-	V_{CC} + 0.5	V
Input LOW Voltage (Input and I/O Pins)	V_{IL}	Guaranteed Logic LOW Level		-0.5	-	0.8	V
Input HIGH Current (Input Pins)	I_{IH}	V_{CC} = Max	V_{IN} = 5.5V	-	-	±1	µA
Input HIGH Current (I/O Pins)	I_{IH}	V_{CC} = Max	$V_{IN} = V_{CC}$	-	-	±1	µA

ELECTRICAL SPECIFICATIONS - DOUBLE DENSITY 3.3V CMOS FCT SERIES (Continued)

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
Input LOW Current (Input Pins)	I_{IL}	V_{CC} = Max	V_{IN} = GND	-	-	±1	µA
Input LOW Current (I/O Pins)	I_{IL}	V_{CC} = Max	V_{IN} = GND	-	-	±1	µA
High Impedance Output Current (Three-State) (Output Pins)	I_{OZH}	V_{CC} = Max	V_{OUT} = V_{CC}	-	-	±1	µA
	I_{OZL}	V_{CC} = Max	V_{OUT} = GND	-	-	±1	µA
Clamp Diode Voltage	V_{IK}	V_{CC} = Min, I_{IN} = -18mA		-	-0.7	-1.2	V
Output HIGH Current	I_{ODH}	V_{CC} = 3.3V, V_{IN} = V_{IH} or V_{IL}, V_O = 1.5V (Note 3)		-36	-60	-110	mA
Output LOW Current	I_{ODL}	V_{CC} = 3.3V, V_{IN} = V_{IH} or V_{IL}, V_O = 1.5V (Note 3)		50	90	200	mA
Output HIGH Voltage	V_{OH}	V_{CC} = Min, V_{IN} = V_{IH} or V_{IL}	I_{OH} = -0.1mA	V_{CC} - 0.2	-	-	V
			I_{OH} = -3mA	2.4	3.0	-	V
		V_{CC} = 3.0V, V_{IN} = V_{IH} or V_{IL}	I_{OH} = -8mA	2.4 (Note 6)	3.0	-	V
			I_{OH} = -24mA	2.0	-	-	V
Output LOW Voltage	V_{OL}	V_{CC} = Min, V_{IN} = V_{IH} or V_{IL}	I_{OL} = 0.1mA	-	-	0.2	V
			I_{OL} = 16mA	-	0.2	0.4	V
			I_{OL} = 24mA	-	0.3	0.5	V
Short Circuit Current (Note 4)	I_{OS}	V_{CC} = Max (Note 3), V_{OUT} = GND		-60	-85	-240	mA
Input Hysteresis	V_H			-	150	-	mV
CAPACITANCE T_A = 25°C, f = 1MHz							
Input Capacitance (Note 5)	C_{IN}	V_{IN} = 0V		-	4.5	6	pF
Output Capacitance (Note 5)	C_{OUT}	V_{OUT} = 0V		-	5.5	8	pF
POWER SUPPLY SPECIFICATIONS							
Quiescent Power Supply Current	I_{CC}	V_{CC} = Max	V_{IN} = GND or V_{CC}	-	0.1	10	µA
Quiescent Power Supply Current TTL Inputs HIGH	ΔI_{CC}	V_{CC} = Max	V_{IN} = VCC - 0.6V (Note 7)	-	2.0	30	µA
Dynamic Power Supply (Note 8)	I_{CCD}	V_{CC} = Max, Outputs Open $x\overline{OE}$ = GND One Bit Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND	-	50	75	µA/ MHz

ELECTRICAL SPECIFICATIONS - DOUBLE DENSITY 3.3V CMOS FCT SERIES (Continued)

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
Total Power Supply Current (Note 10)	I_C	V_{CC} = Max, Outputs Open f_i = 10MHz, 50% Duty Cycle $x\overline{OE}$ = GND One Bit Toggling	V_{IN} = V_{CC} - 0.6V V_{IN} = GND	-	0.5	0.8	mA
		V_{CC} = Max, Outputs Open f_i = 2.5MHz, 50% Duty Cycle $x\overline{OE}$ = GND 16 Bits Toggling	V_{IN} = V_{CC} - 0.6V V_{IN} = GND	-	2.0	3.3 (Note 9)	mA

NOTES:

1. For conditions shown as Max or Min, use appropriate value specified under Electrical Specifications for the applicable device type.
2. Typical values are at V_{CC} = 3.3V, 25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. This parameter is guaranteed but not tested.
5. This parameter is determined by device characterization but is not production tested.
6. V_{OH} = V_{CC} - 0.6V at rated current.
7. Per TTL driven input; all other inputs at V_{CC} or GND.
8. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
9. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.
10. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
    $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_i N_i)$
    I_{CC} = Quiescent Current
    ΔI_{CC} = Power Supply Current for a TTL High Input (Vin = 3.4V)
    D_H = Duty Cycle for TTL Inputs High
    N_T = Number of TTL Inputs at D_H
    I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
    f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)
    f_i = Input Frequency
    N_i = Number of Inputs at f_i
    All currents are in milliamps and all frequencies are in megahertz.

ELECTRICAL SPECIFICATIONS - 3.3V CMOS LPT SERIES

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
DC ELECTRICAL SPECIFICATIONS Over the Operating Range, T_A = -40°C to 85°C, V_{CC} = 2.7V to 3.6V							
Input HIGH Voltage (Input Pins)	V_{IH}	Guaranteed Logic HIGH Level		2.2	-	5.5	V
Input HIGH Voltage (I/O Pins)	V_{IH}	Guaranteed Logic HIGH Level		2.0	-	5.5	V
Input LOW Voltage (Input and I/O Pins)	V_{IL}	Guaranteed Logic LOW Level		-0.5	-	0.8	V
Input HIGH Current (Input Pins)	I_{IH}	V_{CC} = Max	V_{IN} = 5.5V	-	-	±1	µA
Input HIGH Current (I/O Pins)	I_{IH}	V_{CC} = Max	V_{IN} = V_{CC}	-	-	±1	µA
Input LOW Current (Input Pins)	I_{IL}	V_{CC} = Max	V_{IN} = GND	-	-	±1	µA

ELECTRICAL SPECIFICATIONS - 3.3V CMOS LPT SERIES (Continued)

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
Input LOW Current (I/O Pins)	I_{IL}	V_{CC} = Max	V_{IN} = GND	-	-	±1	µA
High Impedance Output Current (Three-State Output Pins)	I_{OZH}	V_{CC} = Max	V_{OUT} = 5.5V	-	-	±1	µA
	I_{OZL}	V_{CC} = Max	V_{OUT} = GND	-	-	±1	µA
Clamp Diode Voltage	V_{IK}	V_{CC} = Min, I_{IN} = -18mA		-	-0.7	-1.2	V
Output HIGH Current	I_{ODH}	V_{CC} = 3.3V, V_{IN} = V_{IH} or V_{IL}, V_O = 1.5V (Note 5)		-36	-60	-110	mA
Output LOW Current	I_{ODL}	V_{CC} = 3.3V, V_{IN} = V_{IH} or V_{IL}, V_O = 1.5V (Note 5)		50	90	200	mA
Output HIGH Voltage	V_{OH}	V_{CC} = Min, V_{IN} = V_{IH} or V_{IL}	I_{OH} = -0.1mA	V_{CC} - 0.2	-	-	V
			I_{OH} = -3mA	2.4	3.0	-	V
		V_{CC} = 3.0V, V_{IN} = V_{IH} or V_{IL}	I_{OH} = -8mA	2.4 (Note 7)	3.0	-	V
			I_{OH} = -24mA	2.0	-	-	V
Output LOW Voltage	V_{OL}	V_{CC} = Min, V_{IN} = V_{IH} or V_{IL}	I_{OL} = 0.1mA	-	-	0.2	V
			I_{OL} = 16mA	-	0.2	0.4	V
			I_{OL} = 24mA	-	0.3	0.5	V
Short Circuit Current (Note 4)	I_{OS}	V_{CC} = Max (Note 3), V_{OUT} = GND		-60	-85	-240	mA
Power Down Disable	I_{OFF}	V_{CC} = 0V, V_{IN} or V_{OUT} ≤4.5V		-	-	±100	µA
Input Hysteresis	V_H			-	150	-	mV
CAPACITANCE T_A = 25°C, f = 1MHz							
Input Capacitance (Note 6)	C_{IN}	V_{IN} = 0V		-	4.5	6	pF
Output Capacitance (Note 6)	C_{OUT}	V_{OUT} = 0V		-	5.5	8	pF
POWER SUPPLY SPECIFICATIONS							
Quiescent Power Supply Current	I_{CC}	V_{CC} = Max	V_{IN} = GND or V_{CC}	-	0.1	10	µA
Quiescent Power Supply Current TTL Inputs HIGH	ΔI_{CC}	V_{CC} = Max	V_{IN} = V_{CC} - 0.6V (Note 7)	-	2.0	30	µA
Dynamic Power Supply Current (Note 8)	I_{CCD}	V_{CC} = Max, Outputs Open $_x\overline{OE}$ = GND One Bit Toggling 50% Duty Cycle	V_{IN} = V_{CC} V_{IN} = GND	-	50	75	µA/ MHz

ELECTRICAL SPECIFICATIONS - 3.3V CMOS LPT SERIES (Continued)

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
Total Power Supply Current (Note 10)	I_C	V_{CC} = Max, Outputs Open f_I = 10MHz, 50% Duty Cycle $_X\overline{OE}$ = GND One Bit Toggling	$V_{IN} = V_{CC}$ - 0.6V V_{IN} = GND	-	0.6	2.3	mA
		V_{CC} = Max, Outputs Open f_I = 2.5MHz, 50% Duty Cycle $_X\overline{OE}$ = GND 16 Bits Toggling	$V_{IN} = V_{CC}$ - 0.6V V_{IN} = GND	-	2.1	4.7 (Note 9)	mA

NOTES:

1. For conditions shown as Max or Min, use appropriate value specified under Electrical Specifications for the applicable device type.
2. Typical values are at V_{CC} = 3.3V, 25°C ambient and maximum loading.
3. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
4. This parameter is guaranteed but not tested.
5. $V_{OH} = V_{CC}$ - 0.6V at rated current.
6. This parameter is determined by device characterization but is not production tested.
7. Per TTL driven input; all other inputs at V_{CC} or GND.
8. This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
9. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.
10. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
    $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_I N_I)$
    I_{CC} = Quiescent Current
    ΔI_{CC} = Power Supply Current for a TTL High Input
    D_H = Duty Cycle for TTL Inputs High
    N_T = Number of TTL Inputs at D_H
    I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
    f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)
    f_I = Input Frequency
    N_I = Number of Inputs at f_I
    All currents are in milliamps and all frequencies are in megahertz.

ELECTRICAL SPECIFICATIONS - 3.3V CMOS LCX SERIES

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
DC ELECTRICAL SPECIFICATIONS Over the Operating Range, T_A = -40°C to 85°C, V_{CC} = 2.7V to 3.6V							
Input HIGH Voltage	V_{IH}	Guaranteed Logic HIGH Level		2.0	-	-	V
Input LOW Voltage	V_{IL}	Guaranteed Logic LOW Level		-	-	0.8	V
Output HIGH Voltage	V_{OH}	V_{CC} = 2.7V to 3.6V	I_{OH} = -0.1mA	V_{CC} - 0.2	-	-	V
		V_{CC} = 2.7V	I_{OH} = -12mA	2.2	-	-	V
		V_{CC} = 3.0V	I_{OH} = -18mA	2.4	-	-	V
			I_{OH} = -24mA	2.2	-	-	V
Output LOW Voltage	V_{OL}	V_{CC} = 2.7V to 3.6V	I_{OL} = 0.1mA	-	-	0.2	V
		V_{CC} = 2.7V	I_{OL} = 12mA	-	-	0.4	V
		V_{CC} = 3V	I_{OL} = 16mA	-	-	0.4	V
			I_{OL} = 24mA	-	-	0.55	V
Clamp Diode Voltage	V_{IK}	V_{CC} = Min, I_{IN} = -18mA		-	-0.7	-1.2	V

ELECTRICAL SPECIFICATIONS - 3.3V CMOS LCX SERIES (Continued)

PARAMETER	SYMBOL	(NOTE 1) TEST CONDITIONS		MIN	(NOTE 2) TYP	MAX	UNITS
Input Leakage Current	I_I	V_{CC} = 2.7V to 3.6V	$0 \le V_I \le 5.5V$	-	-	±5	µA
Output Leakage Current Three-State	I_{OZ}	V_{CC} = 2.7V to 3.6V	$0 \le V_O \le 5.5V$ $V_I = V_{IH}$ or V_{IL}	-	-	±5	µA
Power Down Disable	I_{OFF}	V_{CC} = 0V	V_{IN} or $V_{OUT} \le 5.5V$	-	-	10	µA
Quiescent Power Supply Current	I_{CC}	V_{CC} = Max	V_{IN} = GND or V_{CC}	-	0.1	10	µA
Quiescent Power Supply Current TTL Inputs HIGH	ΔI_{CC}	V_{CC} = Max	$V_{IN} = V_{CC}$ - 0.6V (Note 3)	-	-	500	µA
CAPACITANCE							
Input Capacitance	C_{IN}	V_{CC} = Open, V_{IN} = 0V or V_{CC}		-	7	-	pF
Output Capacitance	C_{OUT}	V_{CC} = 3.3V, V_{IN} = 0V or V_{CC}		-	8	-	pF
Power Dissipation Capacitance	C_{PD}	V_{CC} = 3.3V, V_{IN} = 0V or V_{CC}, f = 10MHz		-	25	-	pF

NOTES:

1. For conditions shown as Max or Min, use appropriate value specified under Electrical Specifications for the applicable device type.
2. Typical values are at V_{CC} = 3.3V, 25°C ambient and maximum loading.
3. Per TTL driven input; all other inputs at V_{CC} or GND.

DC ELECTRICAL SPECIFICATIONS - CD4000 B-SERIES CMOS INTEGRATED CIRCUITS

JEDEC Standard

PARAMETER	SYMBOL	TEST CONDITIONS	TEMP. RANGE	V_{DD} (V)	(NOTE 3) T_{LOW}		25°C			(NOTE 4) T_{HIGH}		UNIT
					MIN	MAX	MIN	TYP	MAX	MIN	MAX	
Quiescent Device Current	I_{DD}	$V_{IN} = V_{SS}$ or V_{DD} All Valid Input Combinations	Mil	5	-	0.25	-	-	0.25	-	7.5	µA
				10	-	0.5	-	-	0.5	-	15	µA
Gates				15	-	1	-	-	1	-	30	µA
			Comm	5	-	1	-	-	1	-	7.5	µA
				10	-	2	-	-	2	-	15	µA
				15	-	4	-	-	4	-	30	µA
Buffers, Flip-Flops	I_{DD}	$V_{IN} = V_{SS}$ or V_{DD} All Valid Input Combinations	Mil	5	-	1	-	-	1	-	30	µA
				10	-	2	-	-	2	-	60	µA
				15	-	4	-	-	4	-	120	µA
			Comm	5	-	4	-	-	4	-	30	µA
				10	-	8	-	-	8	-	60	µA
				15	-	16	-	-	16	-	120	µA

DC ELECTRICAL SPECIFICATIONS - CD4000 B-SERIES CMOS INTEGRATED CIRCUITS

JEDEC Standard **(Continued)**

PARAMETER	SYMBOL	TEST CONDITIONS	TEMP. RANGE	V_{DD} (V)	(NOTE 3) T_{LOW}		25°C			(NOTE 4) T_{HIGH}		UNIT
					MIN	MAX	MIN	TYP	MAX	MIN	MAX	
MSI	I_{DD}	$V_{IN} = V_{SS}$ or V_{DD} All Valid Input Combinations	Mil	5	-	5	-	-	5	-	150	µA
				10	-	10	-	-	10	-	300	µA
				15	-	20	-	-	20	-	600	µA
			Comm	5	-	20	-	-	20	-	150	µA
				10	-	40	-	-	40	-	300	µA
				15	-	80	-	-	80	-	600	µA
Low Level Output Voltage	V_{OL}	$V_{IN} = V_{SS}$ or V_{DD} $\|I_O\| < 1\mu A$	All	5	-	0.05	-	-	0.05	-	0.05	V
				10	-	0.05	-	-	0.05	-	0.05	V
				15	-	0.05	-	-	0.05	-	0.05	V
High Level Output Voltage	V_{OH}	$V_{IN} = V_{SS}$ or V_{DD} $\|I_O\| < 1\mu A$	All	5	4.95	-	4.95	-	-	4.95	-	V
				10	9.95	-	9.95	-	-	9.95	-	V
				15	14.95	-	14.95	-	-	14.95	-	V
Input Low Voltage	V_{IL}	$V_O = 0.5V$ or $4.5V$ $V_O = 1V$ or $9V$ $V_O = 1.5V$ or $13.5V$ $\|I_O\| < 1\mu A$	All	5	-	1.5	-	-	1.5	-	1.5	V
B Types				10	-	3	-	-	3	-	3	V
				15	-	4	-	-	4	-	4	V
UB Types				5	-	1	-	-	1	-	1	V
				10	-	2	-	-	2	-	2	V
				15	-	2.5	-	-	2.5	-	2.5	V
Input High Voltage	V_{IH}	$V_O = 0.5V$ or $4.5V$ $V_O = 1V$ or $9V$ $V_O = 1.5V$ or $13.5V$ $\|I_O\| < 1\mu A$	All	5	3.5	-	3.5	-	-	3.5	-	V
B Types				10	7	-	7	-	-	7	-	V
				15	11	-	11	-	-	11	-	V
UB Types				5	4	-	4	-	-	4	-	V
				10	8	-	8	-	-	8	-	V
				15	12.5	-	12.5	-	-	12.5	-	V
Output Low (Sink) Current	I_{OL}	$V_O = 0.4V$ $V_{IN} = 0V$ or $5V$ $V_O = 0.5V$ $V_{IN} = 0V$ or $10V$ $V_O = 1.5V$ $V_{IN} = 0V$ or $15V$	Mil	5	0.64	-	0.51	-	-	0.36	-	mA
				10	1.6	-	1.3	-	-	0.9	-	mA
				15	4.2	-	3.4	-	-	2.4	-	mA
			Comm	5	0.52	-	0.44	-	-	0.36	-	mA
				10	1.3	-	1.1	-	-	0.9	-	mA
				15	3.6	-	3.0	-	-	2.4	-	mA

DC ELECTRICAL SPECIFICATIONS - CD4000 B-SERIES CMOS INTEGRATED CIRCUITS

JEDEC Standard **(Continued)**

PARAMETER	SYMBOL	TEST CONDITIONS	TEMP. RANGE	V_{DD} (V)	(NOTE 3) T_{LOW}		25°C			(NOTE 4) T_{HIGH}		UNIT
					MIN	MAX	MIN	TYP	MAX	MIN	MAX	
Output High (Source) Current	I_{OH}	V_O = 4.6V, V_{IN} = 0V or 5V	Mil	5	-0.25	-	-0.2	-	-	-0.14	-	mA
		V_O = 9.5V, V_{IN} = 0V or 10V		10	-0.62	-	-0.5	-	-	-0.35	-	mA
		V_O = 13.5V, V_{IN} = 0V or 15V		15	-1.8	-	-1.5	-	-	-1.1	-	mA
			Comm	5	-0.2	-	-0.16	-	-	-0.12	-	mA
				10	-0.5	-	-0.4	-	-	-0.3	-	mA
				15	-1.4	-	-1.2	-	-	-1.0	-	mA
Input Current	I_{IN}	V_{IN} = 0V or 15V	Mil	15	-	±0.1	-	-	±0.1	-	±1	µA
		V_{IN} = 0V or 15V	Comm	15	-	±0.3	-	-	±0.3	-	±1	µA
Three-State Output Leakage Current	I_{OUT} Max	V_{IN} = 0V or 15V	Mil	15	-	±0.4	-	-	±0.4	-	±12	µA
		V_{IN} = 0V or 15V	Comm	15	-	±1.6	-	-	±1.6	-	±12	µA
Input Capacitance Per Unit Load	C_{IN}	Any Input	All	-	-	-	-	-	7.5	-	-	pF

NOTES:

1. Voltages referenced to V_{SS}.
2. Reprinted from JEDEC Standard No. 13-B, "JEDEC Standard Specification for Description of B-Series CMOS Devices".
3. T_{LOW} = -55°C for Military Temperature Range Device, -40°C for Commercial Temperature Device (All Harris Devices).
4. T_{HIGH} = 125°C for Military Temperature Range Device, 85°C for Commercial Temperature Range Device.

STANDARDIZED DC ELECTRICAL SPECIFICATIONS - CD4000 B-SERIES CMOS INTEGRATED CIRCUITS

PARAMETER	SYMBOL	TEST CONDITIONS			LIMITS				25°C			UNIT
		V_O (V)	V_{IN} (V)	V_{DD} (V)	-55°C	-40°C	85°C	125°C	MIN	TYP	MAX	
Quiescent Device Current	I_{DD} Max	-	0, 5	5	0.25	0.25	7.5	7.5	-	0.01	0.25	µA
		-	0, 10	10	0.5	0.5	15	15	-	0.01	0.5	µA
Gates, Inverters (Note 1)		-	0, 15	15	1	1	30	30	-	0.01	1	µA
		-	0, 20	20	5	5	150	150	-	0.02	5	µA
Buffers, Flip-Flops, Latches, Multi-Level Gates (MSI-1 Types) (Note 1)		-	0, 5	5	1	1	30	30	-	0.02	1	µA
		-	0, 10	10	2	2	60	60	-	0.02	2	µA
		-	0, 15	15	4	4	120	120	-	0.02	4	µA
		-	0, 20	20	20	20	600	600	-	0.04	20	µA
Complex Logic (MSI-2 Types) (Note 1)		-	0, 5	5	5	5	150	150	-	0.04	5	µA
		-	0, 10	10	10	10	300	300	-	0.04	10	µA
		-	0, 15	15	20	20	600	600	-	0.04	20	µA
		-	0, 20	20	100	100	3000	3000	-	0.08	100	µA
Output Low (Sink) Current Min	I_{OL} Min	0.4	0, 5	5	0.64	0.61	0.42	0.36	0.51	1	-	mA
		0.5	0, 10	10	1.6	1.5	1.1	0.9	1.3	2.6	-	mA
		1.5	0, 15	15	4.2	4	2.8	2.4	3.4	6.8	-	mA

STANDARDIZED DC ELECTRICAL SPECIFICATIONS - CD4000 B-SERIES CMOS INTEGRATED CIRCUITS

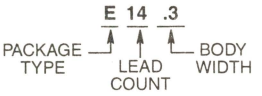
PARAMETER	SYMBOL	TEST CONDITIONS			LIMITS				25°C			UNIT
		V_O (V)	V_{IN} (V)	V_{DD} (V)	-55°C	-40°C	85°C	125°C	MIN	TYP	MAX	
Output High (Source) Current, Min	I_{OH} Min	4.6	0, 5	5	-6.4	-0.61	-0.42	-0.36	-0.51	-1	-	mA
		2.5	0, 5	5	-2	-1.8	-1.3	-1.15	-1.6	-3.2	-	mA
		9.5	0, 10	10	-1.6	-1.5	-1.1	-0.9	-1.3	-2.6	-	mA
		13.5	0, 15	15	-4.2	-4	-2.8	-2.4	-3.4	-6.8	-	mA
Output Voltage Low-Level	V_{OL} Max	-	0, 5	5	0.05				-	0	0.05	V
		-	0, 10	10	0.05				-	0	0.05	V
		-	0, 15	15	0.05				-	0	0.05	V
Output Voltage High-Level	V_{OH} Min	-	0, 5	5	4.95				4.95	5	-	V
		-	0, 10	10	9.95				9.95	10	-	V
		-	0, 15	15	14.95				14.95	15	-	V
Input Low Voltage	V_{IL} Max	0.5, 4.5	-	5	1.5				-	-	1.5	V
		1, 9	-	10	3				-	-	3	V
B Types		1.5, 13.5	-	15	4				-	-	4	V
UB Types		0.5, 4.5	-	5	1				-	-	1	V
		1, 9	-	10	2				-	-	2	V
		1.5, 13.5	-	15	2.5				-	-	2.5	V
Input High Voltage	V_{IH} Max	0.5, 4.5	-	5	3.5				3.5	-	-	V
		1, 9	-	10	7				7	-	-	V
B Types		1.5, 13.5	-	15	11				11	-	-	V
UB Types		0.5, 4.5	-	5	4				4	-	-	V
		1, 9	-	10	8				8	-	-	V
		1.5, 13.5	-	15	12.5				12.5	-	-	V
Input Current	I_{IN} Max	-	0, 18	18	±0.1	±0.1	±1	±1	-	$\pm10^{-5}$	±0.1	µA
Three-State Output Leakage Current	I_{OUT} Max	0, 18	0, 18	18	±0.4	±0.4	±12	±12	-	$\pm10^{-4}$	±0.4	µA

Logic-Package Selection Guide

USING THE SELECTION GUIDE

The first character of each entry indicates the-Package type, while the number-Preceding the decimal-Point details the-Package lead count. The entire entry indicates the-Package table containing the appropriate-Package dimensions. The decimal-Point and succeeding numbers specify the-Package width in inches (e.g. __.15 = 150 mil width.

Example:



PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD54AC00F3A, CD54ACT00F3A	F14.3								3876
CD54AC02F3A, CD54ACT02F3A	F14.3								3877
CD54AC04F3A, CD54ACT04F3A	F14.3								3878
CD54AC05F3A, CD54ACT05F3A	F14.3								3879
CD54AC08F3A, CD54ACT08F3A	F14.3								3880
CD54ACT20F3A	F14.3								3881
CD54AC32F3A, CD54ACT32F3A	F14.3								3882
CD54AC74F3A, CD54ACT74F3A	F14.3								3883
CD54ACT86F3A	F14.3								3884
CD54AC109F3A, CD54ACT109F3A	F16.3								3885
CD54AC112F3A, CD54ACT112F3A	F16.3								3886
CD54AC138F3A, CD54ACT138F3A	F16.3								3887
CD54AC139F3A, CD54ACT139F3A	F16.3								3888
CD54ACT151F3A	F16.3								3889
CD54AC153F3A, CD54ACT153F3A	F16.3								3890
CD54AC157F3A	F16.3								3891
CD54AC161F3A, CD54ACT161F3A	F16.3								3892
CD54AC163F3A, CD54ACT163F3A	F16.3								3893
CD54AC164F3A, CD54ACT164F3A	F14.3								3894
CD54ACT174F3A	F16.3								3895
CD54AC191F3A, CD54ACT191F3A	F16.3								3896
CD54AC193F3A, CD54ACT193F3A	F16.3								3897
CD54AC240F3A, CD54ACT240F3A	F20.3								3898
CD54ACT241F3A	F20.3								3899
CD54AC244F3A, CD54ACT244F3A	F20.3								3900
CD54AC245F3A, CD54ACT245F3A	F20.3								3901
CD54ACT253F3A	F16.3								3902
CD54AC257F3A, CD54ACT257F3A	F16.3								3903
CD54AC273F3A, CD54ACT273F3A	F20.3								3904
CD54AC280F3A, CD54ACT280F3A	F14.3								3905
CD54AC283F3A, CD54ACT283F3A	F16.3								3906
CD54AC299F3A, CD54ACT299F3A	F20.3								3907
CD54ACT323F3A	F20.3								3908
CD54AC373F3A, CD54ACT373F3A	F20.3								3909
CD54AC374F3A, CD54ACT374F3A	F20.3								3910
CD54ACT533F3A	F20.3								3911

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD54AC534F3A, CD54ACT534F3A	F20.3								3912
CD54ACT540F3A	F20.3								3913
CD54AC541F3A, CD54ACT541F3A	F20.3								3914
CD54AC573F3A, CD54ACT573F3A	F20.3								3915
CD54AC574F3A, CD54ACT574F3A	F20.3								3916
CD54ACT623F3A	F20.3								3917
CD74AC00, CD74ACT00				E14.3	M14.15				1855
CD74AC02, CD74ACT02				E14.3	M14.15				1978
CD74AC04, CD74ACT04				E14.3	M14.15				1945
CD74AC05, CD74ACT05				E14.3	M14.15				1945
CD74AC08, CD74ACT08				E14.3	M14.15				1950
CD74AC10, CD74ACT10				E14.3	M14.15				1977
CD74AC14, CD74ACT14				E14.3	M14.15				1984
CD74AC20, CD74ACT20				E14.3	M14.15				1976
CD74AC32, CD74ACT32				E14.3	M14.15				1951
CD74AC74, CD74ACT74				E14.3	M14.15				1881
CD74AC86, CD74ACT86				E14.3	M14.15				1952
CD74AC109, CD74ACT109				E16.3	M16.15				1967
CD74AC112, CD74ACT112				E16.3	M16.15				1967
CD74AC138, CD74ACT138				E16.3	M16.15				1909
CD74AC139, CD74ACT139				E16.3	M16.15				1953
CD74AC151, CD74ACT151				E16.3	M16.15				1980
CD74AC153, CD74ACT153				E16.3	M16.15				1966
CD74AC157, CD74ACT157				E16.3	M16.15				1910
CD74AC158, CD74ACT158				E16.3	M16.15				1910
CD74AC161, CD74ACT161				E16.3	M16.15				1959
CD74AC163, CD74ACT163				E16.3	M16.15				1959
CD74AC164, CD74ACT164				E14.3	M14.15				1954
CD74AC174, CD74ACT174				E16.3	M16.15				1973
CD74AC175, CD74ACT175				E16.3	M16.15				1964
CD74AC191, CD74ACT191				E16.3	M16.15				1911
CD74AC193, CD74ACT193				E16.3	M16.15				1947
CD74AC238, CD74ACT238				E16.3	M16.15				1909
CD74AC240, CD74ACT240				E20.3	M20.3				1856
CD74AC241, CD74ACT241				E20.3	M20.3				1856
CD74AC244, CD74ACT244				E20.3	M20.3	M20.209			1856
CD74AC245, CD74ACT245				E20.3	M20.3	M20.209			1907
CD74AC251, CD74ACT251				E16.3					1981
CD74AC253, CD74ACT253				E16.3	M16.15				1985
CD74AC257, CD74ACT257				E16.3	M16.15	M16.209			1955
CD74AC258, CD74ACT258				E16.3	M16.15				1955
CD74AC273, CD74ACT273				E20.3	M20.3	M20.209			1979
CD74AC280, CD74ACT280				E14.3	M14.15				1957

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD74AC283, CD74ACT283				E16.3	M16.15				1912
CD74AC297, CD74ACT297					M16.15				2195
CD74AC299, CD74ACT299				E20.3	M20.3				1958
CD74AC323, CD74ACT323				E20.3					1958
CD74AC373, CD74ACT373				E20.3	M20.3				1882
CD74AC374, CD74ACT374				E20.3	M20.3				1883
CD74AC533, CD74ACT533				E20.3	M20.3				1882
CD74AC534, CD74ACT534				E20.3	M20.3				1883
CD74AC540, CD74ACT540				E20.3	M20.3				1857
CD74AC541, CD74ACT541				E20.3	M20.3	M20.209			1857
CD74AC563, CD74ACT563				E20.3	M20.3				1956
CD74AC564, CD74ACT564				E20.3	M20.3				1948
CD74AC573, CD74ACT573				E20.3	M20.3				1956
CD74AC574, CD74ACT574				E20.3	M20.3				1948
CD74AC623, CD74ACT623				E20.3	M20.3				1968
CD74AC646, CD74ACT646				E24.3	M24.3	M24.209			1970
CD74AC647, CD74ACT647					M24.3				1982
CD74AC648, CD74ACT648				E24.3	M24.3				1970
CD74AC651, CD74ACT651				E24.3	M24.3				1974
CD74AC652, CD74ACT652				E24.3	M24.3				1974
CD74AC653, CD74ACT653					M24.3				1975
CD74AC654, CD74ACT654				E24.3					1975
CD74AC7060, CD74ACT7060				E20.3	M20.3				2062
CD74AC7623, CD74ACT7623				E20.3	M20.3				1969
CD29FCT520T					M24.3-P		M24.15-P		4164
CD29FCT52T					M24.3-P		M24.15-P		4163
CD54FCT245				E20.3	M20.3	M20.209			2301
CD74FCT138T					M16.3-P, M16.15-P		M16.15A-P		4158
CD74FCT139T					M16.3-P, M16.15-P		M16.15A-P		4159
CD74FCT151T					M16.3-P, M16.15-P		M16.15A-P		4160
CD74FCT153T					M16.3-P, M16.15-P		M16.15A-P		4161
CD74FCT157T					M16.3-P		M16.15A-P		4166
CD74FCT162240T						M48.300-P		M48.240-P	4180
CD74FCT162244T						M48.300-P		M48.240-P	4181
CD74FCT162245T						M48.300-P		M48.240-P	4217
CD74FCT162373T						M48.300-P		M48.240-P	4182
CD74FCT162374T						M48.300-P		M48.240-P	4183
CD74FCT16240T						M48.300-P		M48.240-P	4180
CD74FCT16244T						M48.300-P		M48.240-P	4181
CD74FCT16245T						M48.300-P		M48.240-P	4217
CD74FCT162500T						M56.300-P		M56.240-P	4202

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD74FCT162501T						M56.300-P		M56.240-P	4184
CD74FCT162511T						M56.300-P		M56.240-P	4218
CD74FCT162540T						M48.300-P		M48.240-P	4185
CD74FCT162541T						M48.300-P		M48.240-P	4186
CD74FCT162543T						M56.300-P		M56.240-P	4187
CD74FCT162646T						M56.300-P		M56.240-P	4188
CD74FCT162652T						M56.300-P		M56.240-P	4203
CD74FCT162823T						M56.300-P		M56.240-P	4189
CD74FCT162827T						M56.300-P		M56.240-P	4190
CD74FCT162841T						M56.300-P		M56.240-P	4204
CD74FCT162952T						M56.300-P		M56.240-P	4191
CD74FCT162Q244T						M48.300-P		M48.240-P	4280
CD74FCT162Q245T						M48.300-P		M48.240-P	4277
CD74FCT162Q373T						M48.300-P		M48.240-P	4278
CD74FCT162Q374T						M48.300-P		M48.240-P	4279
CD74FCT163240						M48.300-P		M48.240-P	4255
CD74FCT163244						M48.300-P		M48.240-P	4192
CD74FCT163245						M48.300-P		M48.240-P	4193
CD74FCT163373						M48.300-P		M48.240-P	4194
CD74FCT163374						M48.300-P		M48.240-P	4195
CD74FCT16373T						M48.300-P		M48.240-P	4182
CD74FCT16374T						M48.300-P		M48.240-P	4183
CD74FCT16500T						M56.300-P		M56.240-P	4202
CD74FCT16501T						M56.300-P		M56.240-P	4184
CD74FCT16511T						M56.300-P		M56.240-P	4218
CD74FCT16540T						M48.300-P		M48.240-P	4185
CD74FCT16541T						M48.300-P		M48.240-P	4186
CD74FCT16543T						M56.300-P		M56.240-P	4187
CD74FCT16646T						M56.300-P		M56.240-P	4188
CD74FCT16652T						M56.300-P		M56.240-P	4203
CD74FCT16823T						M56.300-P		M56.240-P	4189
CD74FCT16827T						M56.300-P		M56.240-P	4190
CD74FCT16841T						M56.300-P		M56.240-P	4204
CD74FCT16952T						M56.300-P		M56.240-P	4191
CD74FCT2151T					M16.3-P, M16.15-P		M16.15A-P		4160
CD74FCT2153T					M16.3-P, M16.15-P		M16.15A-P		4161
CD74FCT2157T					M16.3-P		M16.15A-P		4166
CD74FCT2240T					M20.3-P		M20.15-P		4167
CD74FCT2241T					M20.3-P		M20.15-P		4167
CD74FCT2244T					M20.3-P		M20.15-P		4167
CD74FCT2245T					M20.3-P		M20.15-P		4168
CD74FCT2253T					M16.15-P		M16.15A-P		4161

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD74FCT2257T					M16.3-P, M16.15-P		M16.15A-P		4166
CD74FCT2273T					M20.3-P		M20.15-P		4169
CD74FCT2373T					M20.3-P,		M20.15-P		4170
CD74FCT2374T					M20.3-P		M20.15-P		4171
CD74FCT238T					M16.3-P, M16.15-P		M16.15A-P		4158
CD74FCT239T					M16.3-P, M16.15-P		M16.15A-P		4159
CD74FCT240				E20.3	M20.3	M20.209			2227
CD74FCT240AT				E20.3					2227
CD74FCT240T					M20.3-P		M20.15-P		4167
CD74FCT241T					M20.3-P		M20.15-P		4167
CD74FCT244				E20.3	M20.3	M20.209			2227
CD74FCT244AT				E20.3					2227
CD74FCT244T					M20.3-P		M20.15-P		4167
CD74FCT245				E20.3	M20.3	M20.209			2301
CD74FCT245T					M20.3-P		M20.15-P		4168
CD74FCT251T					M16.3-P, M16.15-P		M16.15A-P		4160
CD74FCT253T					M16.3-P, M16.15-P		M16.15A-P		4161
CD74FCT2541T					M20.3-P		M20.15-P		4167
CD74FCT2543T					M24.3-P		M24.15-P		4173
CD74FCT2573T					M20.3-P		M20.15-P		4170
CD74FCT2574T					M20.3-P		M20.15-P		4171
CD74FCT257T					M16.3-P		M16.15A-P		4166
CD74FCT2646T					M24.3-P		M24.15-P		4175
CD74FCT2652T					M24.3-P		M24.15-P		4175
CD74FCT273				E20.3	M20.3				2303
CD74FCT273T					M20.3-P		M20.15-P		4169
CD74FCT2821T					M24.3-P		M24.15-P		4176
CD74FCT2823T					M24.3-P		M24.15-P		4176
CD74FCT2827T					M24.3-P		M24.15-P		4179
CD74FCT2828T					M24.3-P		M24.15-P		4179
CD74FCT2841T					M24.3-P		M24.15-P		4177
CD74FCT373				E20.3	M20.3	M20.209			2230
CD74FCT373AT				E20.3					2230
CD74FCT373T					M20.3-P		M20.15-P		4170
CD74FCT374				E20.3	M20.3	M20.209			2305
CD74FCT374T					M20.3-P		M20.15-P		4171
CD74FCT377T					M20.3-P		M20.15-P		4172
CD74FCT399T					M16.3-P, M16.15-P		M16.15A-P		4252
CD74FCT521T					M20.3-P		M20.15-P		4214

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD74FCT533T					M20.3-P		M20.15-P		4170
CD74FCT534T					M20.3-P		M20.15-P		4171
CD74FCT540				E20.3	M20.3				2283
CD74FCT540T					M20.3-P		M20.15-P		4167
CD74FCT541				E20.3	M20.3	M20.209			2383
CD74FCT541T					M20.3-P		M20.15-P		4167
CD74FCT543				E24.3	M24.3	M24.209			2399
CD74FCT543T					M24.3-P		M24.15-P		4173
CD74FCT544T					M24.3-P		M24.15-P		4173
CD74FCT564				E20.3	M20.3	M20.209			2295
CD74FCT573					M20.3	M20.209			2304
CD74FCT573AT				E20.3					2304
CD74FCT573T					M20.3-P		M20.15-P		4170
CD74FCT574				E20.3	M20.3	M20.209			2295
CD74FCT574T					M20.3-P		M20.15-P		4171
CD74FCT623T					M20.3-P		M20.15-P		4174
CD74FCT640T					M20.3-P		M20.15-P		4168
CD74FCT646				E24.3	M24.3	M24.209			2393
CD74FCT646T					M24.3-P		M24.15-P		4175
CD74FCT648T					M24.3-P		M24.15-P		4175
CD74FCT651				E24.3	M24.3				2394
CD74FCT651T					M24.3-P		M24.15-P		4175
CD74FCT652				E24.3	M24.3				2394
CD74FCT652T					M24.3-P		M24.15-P		4175
CD74FCT653				E24.3	M24.3				2403
CD74FCT654				E24.3	M24.3				2403
CD74FCT821A				E24.3	M24.3				2390
CD74FCT821T					M24.3-P		M24.15-P		4176
CD74FCT822A				E24.3					2390
CD74FCT823A				E24.3					2389
CD74FCT823T					M24.3-P		M24.15-P		4176
CD74FCT824A				E24.3					2389
CD74FCT825T					M24.3-P		M24.15-P		4176
CD74FCT827T					M24.3-P		M24.15-P		4179
CD74FCT828T					M24.3-P		M24.15-P		4179
CD74FCT841A				E24.3	M24.3				2397
CD74FCT841T					M24.3-P		M24.15-P		4177
CD74FCT842A					M24.3				2397
CD74FCT843A					M24.3				2396
CD74FCT843T					M24.3-P		M24.15-P		4177
CD74FCT844A				E24.3					2396
CD74FCT845T					M24.3-P		M24.15-P		4177
CD74FCT861A					M24.3				2392

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

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PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD74FCT861T					M24.3-P		M24.15-P		4178
CD74FCT863A					M24.3, M24.3-P		M24.15-P		4178
CD74FCT863T					M24.3-P		M24.15-P		4178
CD74FCT864T					M24.3-P		M24.15-P		4178
CD74LPT16240						M48.300-P		M48.240-P	4215
CD74LPT16244						M48.300-P		M48.240-P	4216
CD74LPT16245						M48.300-P		M48.240-P	4205
CD74LPT16373						M48.300-P		M48.240-P	4206
CD74LPT16374						M48.300-P		M48.240-P	4207
CD74LPT16501						M56.300-P		M56.240-P	4208
CD74LPT16543						M56.300-P		M56.240-P	4209
CD74LPT16646						M56.300-P		M56.240-P	4210
CD74LPT16652						M56.300-P		M56.240-P	4211
CD74LPT16827						M56.300-P		M56.240-P	4212
CD74LPT16952						M56.300-P		M56.240-P	4213
CD74LPT241					M20.3-P		M20.15-P		4196
CD74LPT244					M20.3-P		M20.15-P		4197
CD74LPT245					M20.3-P		M20.15-P		4198
CD74LPT373					M20.3-P		M20.15-P		4199
CD74LPT541					M20.3-P		M20.15-P		4200
CD74LPT543					M24.3-P		M24.15-P		4256
CD74LPT573					M20.3-P		M20.15-P		4201
CD74LPT646					M24.3-P		M24.15-P		4257
CD74LPT652					M24.3-P		M24.15-P		4257
CD74LPT827					M24.3-P		M24.15-P		4258
CD74HC00, CD74HCT00				E14.3	M14.15				1464
CD74HC02, CD74HCT02				E14.3	M14.15				1647
CD74HC03, CD74HCT03				E14.3	M14.15				1832
CD74HC04, CD74HCT04				E14.3	M14.15				1471
CD74HC08, CD74HCT08				E14.3	M14.15				1549
CD74HC10, CD74HCT10				E14.3	M14.15				1551
CD74HC11, CD74HCT11				E14.3	M14.15				1475
CD74HC14, CD74HCT14				E14.3	M14.15				1781
CD74HC20, CD74HCT20				E14.3	M14.15				1601
CD74HC21, CD74HCT21				E14.3	M14.15				1782
CD74HC27, CD74HCT27				E14.3	M14.15				1648
CD74HC30, CD74HCT30				E14.3	M14.15				1652
CD74HC32, CD74HCT32				E14.3	M14.15				1643
CD74HC42, CD74HCT42				E16.3	M16.15				1689
CD74HC73, CD74HCT73				E14.3	M14.15				1721
CD74HC74, CD74HCT74				E14.3	M14.15				1476
CD74HC75, CD74HCT75				E16.3	M16.15				1666

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD74HC85, CD74HCT85				E16.3	M16.15				1770
CD74HC86, CD74HCT86				E14.3	M14.15				1644
CD74HC93, CD74HCT93				E14.3	M14.15				1849
CD74HC107, CD74HCT107				E14.3	M14.15				1722
CD74HC109, CD74HCT109				E16.3	M16.15				1667
CD74HC112, CD74HCT112				E16.3	M16.15				1843
CD74HC123, CD74HCT123				E16.3	M16.15				1708
CD74HC125, CD74HCT125				E14.3	M14.15				1771
CD74HC126, CD74HCT126				E14.3	M14.15				1772
CD74HC132, CD74HCT132				E14.3	M14.15				1649
CD74HC137, CD74HCT137				E16.3	M16.15				1886
CD74HC138, CD74HCT138				E16.3	M16.15				1477
CD74HC139, CD74HCT139				E16.3	M16.15				1545
CD74HC147, CD74HCT147				E16.3	M16.15				1773
CD74HC151, CD74HCT151				E16.3	M16.15				1645
CD74HC153, CD74HCT153				E16.3	M16.15				1774
CD74HC154, CD74HCT154				E24.3, E24.6					1657
CD74HC157, CD74HCT157				E16.3	M16.15				1642
CD74HC158, CD74HCT158				E16.3	M16.15				1642
CD74HC161, CD74HCT161				E16.3	M16.15				1550
CD74HC163, CD74HCT163				E16.3	M16.15				1550
CD74HC164, CD74HCT164				E14.3	M14.15				1658
CD74HC165, CD74HCT165				E16.3	M16.15				1672
CD74HC166, CD74HCT166				E16.3	M16.15				1501
CD74HC173, CD74HCT173				E16.3	M16.15				1641
CD74HC174, CD74HCT174				E16.3	M16.15				1608
CD74HC175, CD74HCT175				E16.3	M16.15				1474
CD74HC191, CD74HCT191				E16.3	M16.15				1662
CD74HC192				E16.3	M16.15				1674
CD74HC194, CD74HCT194				E16.3	M16.15				1668
CD74HC195				E16.3	M16.15				1482
CD74HC221, CD74HCT221				E16.3	M16.15				1670
CD74HC237, CD74HCT237				E16.3	M16.15				1886
CD74HC238, CD74HCT238				E16.3	M16.15				1477
CD74HC240, CD74HCT240				E20.3	M20.3				1656
CD74HC241, CD74HCT241				E20.3	M20.3				1656
CD74HC242, CD74HCT242,				E14.3	M14.15				1488
CD74HC243, CD74HCT243				E14.3	M14.15				1488
CD74HC244				E20.3	M20.3				1656
CD74HC245, CD74HCT245				E20.3	M20.3				1651
CD74HC251, CD74HCT251				E16.3	M16.15				1489

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

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PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD74HC253, CD74HCT253				E16.3	M16.15				1673
CD74HC257, CD74HCT257				E16.3	M16.15				1650
CD74HCT258				E16.3	M16.15				1775
CD74HC259, CD74HCT259				E16.3	M16.15				1727
CD74HC273, CD74HCT273				E20.3	M20.3				1479
CD74HC280, CD74HCT280				E14.3	M14.15				1669
CD74HC283, CD74HCT283				E16.3	M16.15				1848
CD74HC297, CD74HCT297				E16.3					1852
CD74HC299, CD74HCT299				E20.3	M20.3				1485
CD74HC354, CD74HCT354				E20.3					1690
CD74HC356, CD74HCT356				E20.3					1690
CD74HC365, CD74HCT365				E16.3	M16.15				1539
CD74HC366, CD74HCT366				E16.3	M16.15				1539
CD74HC367, CD74HCT367				E16.3	M16.15				1538
CD74HC368, CD74HCT368				E16.3	M16.15				1538
CD74HC373, CD74HCT373				E20.3	M20.3				1679
CD74HC374, CD74HCT374				E20.3	M20.3				1663
CD74HC377, CD74HCT377				E20.3	M20.3				1675
CD74HC390, CD74HCT390				E16.3	M16.15				1838
CD74HC393, CD74HCT393				E14.3	M14.15				1653
CD74HC423, CD74HCT423				E16.3	M16.15				1708
CD74HC533, CD74HCT533				E20.3					1599
CD74HC534, CD74HCT534				E20.3	M20.3				1640
CD74HC540, CD74HCT540				E20.3	M20.3				1659
CD74HC541, CD74HCT541				E20.3	M20.3				1659
CD74HC563, CD74HCT563				E20.3	M20.3				1599
CD74HC564, CD74HCT564				E20.3	M20.3				1640
CD74HC573, CD74HCT573				E20.3	M20.3				1679
CD74HC574, CD74HCT574				E20.3	M20.3				1663
CD74HC583, CD74HCT583				E16.3					1828
CD74HC597, CD74HCT597				E16.3	M16.15				1915
CD74HC640, CD74HCT640				E20.3	M20.3				1677
CD74HC643, CD74HCT643				E20.3					1677
CD74HC646, CD74HCT646				E24.3, E24.6	M24.3				1664
CD74HC648, CD74HCT648				E24.3	M24.3				1664
CD74HC670, CD74HCT670				E16.3	M16.15				1660
CD74HC688, CD74HCT688				E20.3	M20.3				1646
CD74HC4002, CD74HCT4002				E14.3	M14.15				1776
CD74HC4015, CD74HCT4015				E16.3	M16.15				1678
CD74HC4016, CD74HCT4016				E14.3					1917
CD74HC4017, CD74HCT4017				E16.3	M16.15				1639
CD74HC4020, CD74HCT4020				E16.3	M16.15				1484

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD74HC4024, CD74HCT4024				E16.3	M16.15				1683
CD74HC4040, CD74HCT4040				E16.3	M16.15				1483
CD74HC4046A, CD74HCT4046A				E16.3	M16.15				1854
CD74HC4049				E16.3	M16.15				1543
CD74HC4050				E16.3	M16.15				1543
CD74HC4051, CD74HCT4051				E16.3	M16.15				1676
CD74HC4052, CD74HCT4052				E16.3	M16.15				1676
CD74HC4053, CD74HCT4053				E16.3	M16.15				1676
CD74HC4059, CD74HCT4059				E24.3, E24.6	M24.3				1853
CD74HC4060, CD74HCT4060				E16.3	M16.15				1654
CD74HC4066, CD74HCT4066				E14.3	M14.15				1777
CD74HC4067, CD74HCT4067				E24.3	M24.3				1783
CD74HC4075, CD74HCT4075				E14.3	M14.15				1778
CD74HC4094, CD74HCT4094				E16.3	M16.15				1779
CD74HC4316, CD74HCT4316				E16.3	M16.15				1916
CD74HC4351, CD74HCT4351				E20.3	M20.3				2145
CD74HC4352, CD74HCT4352				E20.3	M20.3				2145
CD74HC4353, CD74HCT4353				E20.3					2145
CD74HC4510, CD74HCT4510					M16.15				1823
CD74HC4511, CD74HCT4511				E16.3	M16.15				1786
CD74HC4514, CD74HCT4514				E24.3, E24.6	M24.3				1597
CD74HC4515, CD74HCT4515				E24.3, E24.6	M24.3				1597
CD74HC4516, CD74HCT4516				E16.3	M16.15				1823
CD74HC4518, CD74HCT4518				E16.3	M16.15				1665
CD74HC4520, CD74HCT4520				E16.3	M16.15				1665
CD74HC4538, CD74HCT4538				E16.3	M16.15				1671
CD74HC4543, CD74HCT4543				E16.3					1822
CD74HC7030, CD74HCT7030				E28.6					2122
CD74HC7046A, CD74HCT7046A				E16.3	M16.15				1920
CD74HC7266				E14.3	M14.15				1780
CD74HC40102, CD74HCT40102				E16.3	M16.15				1596
CD74HC40103, CD74HCT40103				E16.3	M16.15				1596
CD74HC40104, CD74HCT40104					M16.15				1661
CD74HC40105, CD74HCT40105				E16.3	M16.15				1834
CD74HCU04				E14.3	M14.15				1655
CD4001B	F14.3	K14.B		E14.3					985
CD4001UB	F14.3			E14.3					945
CD4002B	F14.3	K14.B		E14.3					985
CD4006B	F14.3			E14.3					1033
CD4007UB	F14.3			E14.3					977
CD4008B	F16.3			E16.3					951

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

Logic-Package Selection Guide

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD4009UB	F16.3			E16.3					940
CD4010B	F16.3			E16.3					940
CD4011B	F14.3	K14.B		E14.3					3718
CD4011UB	F14.3			E14.3					947
CD4012B	F14.3			E14.3					3718
CD4013B	F14.3	K14.B		E14.3					936
CD4014B	F16.3			E16.3					1043
CD4015B	F16.3			E16.3					1024
CD4016B	F14.3			E14.3					953
CD4017B	F16.3			E16.3					1113
CD4018B	F16.3	K16.D		E16.3					1034
CD4019B	F16.3			E16.3					1045
CD4020B	F16.3			E16.3					1063
CD4021B	F16.3			E16.3					1043
CD4022B	F16.3			E16.3					1113
CD4023B	F14.3	K14.B		E14.3					3718
CD4024B	F14.3			E14.3					1063
CD4025B	F14.3			E14.3					985
CD4026B	F16.3			E16.3					1118
CD4027B	F16.3	K16.D		E16.3					942
CD4028B	F16.3			E16.3					1016
CD4029B	F16.3			E16.3					1028
CD4030B	F14.3			E14.3					1055
CD4031B	F16.3			E16.3					1073
CD4033B				E16.3					1118
CD4034B	F24.6			E24.6					1062
CD4035B	F16.3			E16.3					1101
CD4040B	F16.3			E16.3					1063
CD4041UB	F14.3			E14.3					934
CD4042B	F16.3	K16.D		E16.3					954
CD4043B	F16.3			E16.3					956
CD4044B	F16.3			E16.3					956
CD4045B				E16.3					1119
CD4046B	F16.3			E16.3					1099
CD4047B	F14.3		D14.3	E14.3					1123
CD4048B	F16.3			E16.3					1124
CD4049UB	F16.3	K16.D		E16.3					926
CD4050B	F16.3	K16.D		E16.3					926
CD4051B	F16.3			E16.3					902
CD4052B	F16.3		D16.3	E16.3					902
CD4053B	F16.3			E16.3					902
CD4054B	F16.3			E16.3					634
CD4055B				E16.3					634

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD4056B	F16.3			E16.3					634
CD4059A	F24.6		D24.6	E24.6					898
CD4060B	F16.3			E16.3					1120
CD4063B	F16.3			E16.3					805
CD4066B	F14.3	K14.B		E14.3					1114
CD4067B	F24.6			E24.6					3719
CD4068B	F14.3			E14.3					809
CD4069UB	F14.3	K14.B		E14.3					804
CD4070B	F14.3			E14.3					910
CD4071B	F14.3			E14.3					807
CD4072B	F14.3			E14.3					807
CD4073B	F14.3			E14.3					806
CD4075B	F14.3	K14.B	D14.3	E14.3					807
CD4076B	F16.3			E16.3					903
CD4077B	F14.3			E14.3					910
CD4078B	F14.3			E14.3					810
CD4081B	F14.3			E14.3					806
CD4082B	F14.3			E14.3					806
CD4085B	F14.3			E14.3					811
CD4086B	F14.3			E14.3					812
CD4089B	F16.3			E16.3					1003
CD4093B	F14.3			E14.3					836
CD4094B	F16.3			E16.3					3707
CD4095B				E14.3					879
CD4096B				E14.3					879
CD4097B				E24.6					3719
CD4098B	F16.3			E16.3					979
CD4099B	F16.3			E16.3					948
CD4502B	F16.3			E16.3					1002
CD4503B	F16.3			E16.3					1224
CD4504B	F16.3		D16.3	E16.3					1846
CD4508B	F24.6		D24.6	E24.6					1009
CD4510B				E16.3					899
CD4511B	F16.3	K16.D		E16.3					901
CD4512B	F16.3			E16.3					1032
CD4514B	F24.6			E24.6					3721
CD4515B	F24.6		D24.6	E24.6					3721
CD4516B	F16.3	K16.D		E16.3					899
CD4517B	F16.3			E16.3					1148
CD4518B	F16.3			E16.3					808
CD4519B	F16.3			E16.3					1723
CD4520B	F16.3			E16.3					808
CD4521B	F16.3			E16.3					1735

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

Logic-Package Selection Guide

PART NUMBERS	CERDIP	FLAT-PACK	SIDE-BRAZE	PDIP	SOIC	SSOP	QSOP	TSSOP	DOC. #
CD4522B	F16.3			E16.3					1710
CD4527B				E16.3					1006
CD4529B	F16.3			E16.3					1720
CD4532B	F16.3			E16.3					876
CD4536B	F16.3			E16.3					1186
CD4541B	F14.3			E14.3					1378
CD4543B				E16.3					1327
CD4555B	F16.3	K16.D	D16.3	E16.3					858
CD4556B	F16.3			E16.3					858
CD4560B	F16.3			E16.3					1711
CD4566B				E16.3					1728
CD4572UB				E16.3					1704
CD4585B	F16.3		D16.3	E16.3					1146
CD4724B	E16.3			E16.3					1111
CD7211				E40.6					1725
CD7211A				E40.6					1725
CD7211AM				E40.6					1726
CD7211M				E40.6					1726
CD14538B	F16.3		D16.3	E16.3					3737
CD22402			D24.6	E24.6					1686
CD22777				E8.3					1869
CD40100B				E16.3					980
CD40102B				E16.3					984
CD40103B	F16.3			E16.3					984
CD40105B	F16.3	K16.D	D16.3	E16.3					1044
CD40106B				E14.3					1017
CD40107B	F14.3			E8.3					1015
CD40109B	F16.3	K16.D		E16.3					3722
CD40110B				E16.3					1125
CD40116			D22.4A	E22.4					1234
CD40117B				E14.3					1333
CD40147B	F16.3			E16.3					1117
CD40160B	F16.3			E16.3					1047
CD40161B	F16.3			E16.3					1047
CD40163B	F16.3		D16.3	E16.3					1047
CD40174B	F16.3			E16.3					1031
CD40175B	F16.3			E16.3					1326
CD40192B	F16.3			E16.3					993
CD40193B				E16.3					993
CD40194B		K16.D	D16.3	E16.3					1220
CD40257B	F16.3			E16.3					982

Packaging information is available in Section 16. See Section 13 for Military and Space Logic products.

MILITARY AND SPACE

13

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Military and Space Products

Military and Space Devices

Harris has been an industry leader for more than three decades, supplying Military and Radiation Hardened circuits that provide high reliability and superior performance in severe operating environments. As the largest supplier of these types of products in the world, we are dedicated to providing dependable, long-term service. Our continuing investment in products, technology and services is proof of our commitment to support the specific needs of this unique customer community.

Military Devices

Harris offers a complete selection of ICs, tested at various levels, for use in military systems and harsh environments. These devices are classified as either non-compliant, tested to Harris datasheet requirements; or QML and ISO 9000 compliant, manufactured and tested to /883 Class B, JAN slash sheet, or Standard Military Drawing (SMD) requirements.

A wide variety of Power MOSFETs are available that are MIL-PRF-19500, ISO 9000 and QPL certified. They are manufactured and tested to JAN TX / TXV specifications. Metal Oxide Varistors (MOVs) are also available that are CECC-00100 and ISO 9000 certified. An entire range of voltage options are available that have been tested to QPL or JAN specifications.

Radiation Hardened Devices

Harris Semiconductor received full QML certification from the Defense Supply Center Columbus (DSCC) in Dec.'95. All Radiation Hardened ICs are MIL-PRF-38535 certified and manufactured in full compliance to Class V and/or Class Q flows. The most current test limits and conditions are documented in SMDs controlled by DSCC, so these devices must be ordered by their corresponding SMD device number. (Please refer to the Cross Reference at the end of this section.)

An extensive portfolio of Radiation Hardened MOSFETs is also available featuring our new Single Event Gate Rupture (SEGR) immune devices. Manufacturing is MIL-PRF-19500 and ISO9000 certified and testing is done in full compliance with MIL-STD-750 test methods. Several levels of screening and radiation ratings are available.

Device Selection

Selection Charts, Nomenclature Guides and the Cross Reference List are provided to help with the selection process. After using the Selection Charts to find a specific device, the Nomenclature Guides can be used to verify the prefix and suffix format for that family of products. The Cross Reference List can then be used to identify all available options and provide the exact ordering information required. Engineers at our 1-800-4HARRIS (1-800-442-7747) Central Applications Hotline can assist with the device selection process and answer any technical questions you may have.

MSP Ordering Nomenclature

5962 SMD/DSCC - QML TYPES

5962 - XXXXX 0X X X X

SMD ID NUMBER
(Does Not Change) (ID Not Applicable in Earlier DESC Items)

DEVICE CLASS DESIGNATOR
-: Non-Rad Hard
M: 3×10^3 (3K RADS)
D: 10^4 (10K RADS)
R: 10^5 (100K RADS)
F: 3×10^5 (300K RADS)

DRAWING NUMBER
(DSCC AND SMD)

DEVICE TYPE
(Paragraph 1.2.1 Of SMD/DESC Drawing)

DEVICE CLASS DESIGNATOR
(If Applicable)
Q: QML Class B (38535)
M: QML Class B (MIL-STD-883)
V: QML Class S, Space Level
N: Non-Traditional Packages and Temp Ranges (i.e. Plastic Packages, -40°C to 85°C Temperature Range)

CASE OUTLINE
Case outlines are listed in the specific SMD and detailed in MIL-STD-1835, Section 4.

LEAD FINISH
A = Solder Dip
C = Gold

NOTE: Nomenclature Per MIL-PRF-38535

80C, 82CXXX TYPES

M D 80C86 - 2 /B

TEMPERATURE RANGE
C: 0°C to 70°C
I: -40°C to 85°C
M: -55°C to 125°C

SUFFIX
/B: -55°C to 125°C with Burn-In
/883: Current Rev Compliant
/7: Thin EPI, Current Rev 883 Compliant

SPEED DESIGNATION

Peripherals	µProcessors
-5: 5MHz	Blank: 5MHz
Blank: 8MHz	-2: 8MHz
-10: 10MHz	-10: 10MHz
-12: 12MHz	-12: 12MHz
	-20: 20MHz
	-25: 25MHz

PACKAGE DESIGNATOR
P: Dual-In-Line Plastic (PDIP)
D: Ceramic Dual-In-Line Frit-Seal (CERDIP) or Ceramic Dual-In-Line Metal Seal (SBDIP)
G: Ceramic Pin Grid Array (CPGA)
R: Ceramic Leadless Chip Carrier (CLCC)
S: Plastic Leaded Chip Carrier (PLCC)
M: Small Outline Plastic (SOIC)

PART NUMBER
80CXXX: CMOS Microprocessors
82CXXX: CMOS Peripherals

ACS, ACTS, HCS, HCTS RADIATION HARDENED TYPES

HCSXXX **D** **MS** **R**

PART NUMBER
ACS, HCS: CMOS Compatible
ACTS, HCTS: TTL Compatible

HARDNESS ASSURANCE LEVEL
R: 2×10^5 (200K RADS)

CLASS
MS: Class V (Note 1)

SAMPLE
/SAMPLE: 25°C Temperature Tested (Note 2)

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
H: Die
K: Ceramic Flatpack

NOTES:
1. FLIGHT UNITS MUST BE ORDERED BY SMD#.
   A cross reference table is available on the Harris website at http://www.semi/harris.com/datasheets/smd/smd_xref.
2. /SAMPLE available for design-in/breadboarding - NOT FOR FLIGHT.

CA TYPES

CA3260 **A** **T** **3**

PART NUMBER
CAXXXX

ELECTRICAL OPTIONS
A, B, C, Blank

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
E: Dual-In-Line Plastic (PDIP)
F: Ceramic Dual-In-Line Frit-Seal(CERDIP)
J: Ceramic Leadless Chip Carrier (CLCC)
M: Small Outline Plastic (SOIC)
Q: Plastic Leaded Chip Carrier (PLCC)
S: DIL Formed TO-5
T: Can
Z: Single-In-Line Plastic (SIP)
Blank: Refer to Data Sheet for Package Type

SUFFIX
3: -55°C to 125°C Modified Class B
3W: Modified Class B without High & Low Temperature DC
96: Tape and Reel

NOTE: If the part number contains three digits, add a leading zero when ordering. Example: CA555 becomes CA0555.

MSP Ordering Nomenclature

CD (AC, ACT, HC, HCT) TYPES

CD — Prefix Designation for Harris CMOS Digital Logic IC

XX — **TEMPERATURE RANGE**
54/74: Refer to Individual Data Sheets for Temperature Range

XXX — **LOGIC LEVEL**
- AC: Advanced CMOS Logic CMOS Input Levels
- ACT: Advanced CMOS Logic TTL Input Levels
- HC: High Speed CMOS Logic CMOS Input Levels
- HCT: High Speed CMOS Logic TTL Input Levels
- HCU: High Speed CMOS Logic CMOS Input Levels, Unbuffered

XXXXX — Type Designation Up to 5 Digits

XX — **PACKAGE DESIGNATOR**
- E: Dual-In-Line Plastic (PDIP)
- EN: Narrow Dual-In-Line Plastic (PDIP)
- F: Ceramic Dual-In-Line Frit-Seal (CERDIP)
- H: Chip
- M: Small Outline Plastic (SOIC)
- SM: Shrink Small Outline Plastic (SSOP)
- W: Wafer

XX — **HIGH-RELIABILITY SCREENING**
- 3A: Fully Compliant with MIL-STD-883 (Note 1)
- X: 160 Hour Burn-In (125°C) (Note 2)
- 96: Tape and Reel

NOTES:
1. JAN(38510) or SMD(5962) numbers must be used for order entry, where these options exist.
2. Most Harris CMOS Logic ICs are available with burn-in to enhance commercial reliability. This cost-effective approach is provided by the Harris Enhanced Product. Enhanced Product is identified with the suffix "X", e.g., CD74HC/HCT373EX.

CD22XXX TYPES

CD22 — Prefix Designation for Harris Telecom IC's

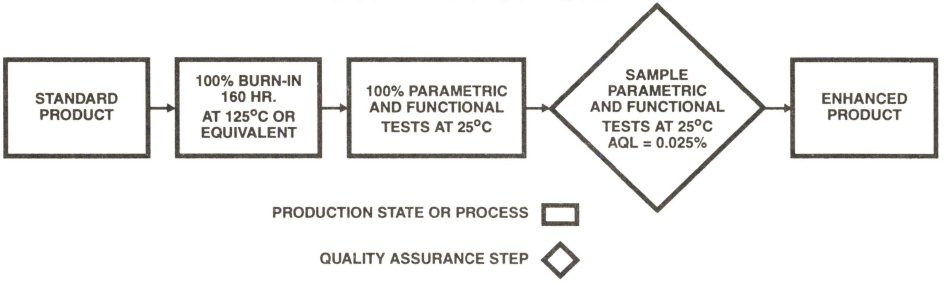
XXXXX — **PART NUMBER**

A — **REVISION**
A: 1st
B: 2nd etc.

E — **PACKAGE DESIGNATOR**
- D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
- E: Dual-In-Line Plastic (PDIP)
- F: Ceramic Dual-In-Line Frit-Seal (CERDIP)
- M: Small Outline Plastic (SOIC)
- Q: Plastic Leaded Chip Carrier (PLCC)
- H: Chip

X — **SCREENING OPTION**
X: Enhanced Product Screening i.e., Burn-In (Optional for D, E Package Types)

X SUFFIX PRODUCT FLOW



CD4000 TYPES

CD — Prefix Designation for Harris Digital Logic IC

4XXXX — Type Designation Up to 5 Digits

XX — **SUPPLY VOLTAGE**
- A: 12V Max
- B: 18V Max
- UB: 18V Max, Unbuffered

X — **PACKAGE DESIGNATOR**
- E: Dual-In-Line Plastic (PDIP)
- F: Ceramic Dual-In-Line Frit-Seal (CERDIP)
- K: Ceramic Flatpack
- M: Small Outline Plastic (SOIC)
- H: Chip
- W: Wafer

X — **HIGH-RELIABILITY SCREENING**
- 3: Non-Compliant with MIL-STD-883 Class B
- 3A: Fully Compliant with MIL-STD-883 Class B (Note 1)
- X: 160 Hour Burn-In (125°C) (Note 2)

NOTES:

1. JAN (38510) or SMD (5962) numbers must be used for order entry, where these options exist.
2. Most Harris CMOS Logic ICs are available with burn-in to enhance commercial reliability. This cost-effective approach is provided by the Harris Enhanced Product. Enhanced Product is identified with the suffix "X", e.g., CD4016BEX.

CD4000 RADIATION HARDENED TYPES

CD4000 — **PART NUMBER** CD4000

B — **SERIES**
- B: Buffered
- UB: Un-Buffered

D — **PACKAGE DESIGNATOR**
- D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
- H: Die
- K: Ceramic Flatpack

MS — **CLASS**
- MS: Class V (Note 1)
- NS: Class V with Neutron Irradiation (Note 1)

R — **HARDNESS ASSURANCE LEVEL**
- R: 10^5 (100K RADS)

NOTE:

1. FLIGHT UNITS MUST BE ORDERED BY SMD#.
   A cross reference table is available on the Harris website at http://www.semi/harris.com/datasheets/smd/smd_xref.

CDP/CMM/MWS TYPES

CDP1802 — **PART NUMBER** (CMOS LSI)
- CDP18XX
- CMMXXXX
- MWS51XX: RAM

A — **REVISION**
- A: 1st
- B: 2nd

C — **VOLTAGE**
- C: 5V Device

D — **PACKAGE DESIGNATOR**
- D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
- E: Dual-In-Line Plastic (PDIP)
- K: Ceramic Flatpack
- Q or N: Plastic Leaded Chip Carrier (PLCC)

3 — **PRODUCT ASSURANCE LEVEL**
- X: -40°C to 85°C with Burn-In
- 3: Non-Compliant with MIL-STD-883

CMM, GP RADIATION HARDENED TYPES

CMM5114 A D 3

PART NUMBER

REVISION
A: 1st
B: 2nd

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
K: Ceramic Flatpack
J: Ceramic Leadless Chip Carrier (CLCC)

PRODUCT ASSURANCE LEVEL
3: Class Q, 10K Rad(Si)
3Z: Class Q, 10K Rad(Si)
1RZ: Class V, 10K Rad(Si)

DG TYPES

DG XXXX X X /883

DEVICE FAMILY PREFIX
Switches and MUXs

PART NUMBER

TEMPERATURE RANGE
A: -55°C to 125°C
B: 25°C to 85°C
C: 0°C to 70°C
D: -40°C to 85°C
E: -40°C to 85°C Extended Process Flow with Burn-In and 100% Temp Testing.

PACKAGE DESIGNATOR
A: Can
J: Dual-In-Line Plastic (PDIP)
K: Ceramic Dual-In-Line Frit-Seal (CERDIP)
P: Ceramic Dual-In-Line Metal Seal (SBDIP)
Y: Small Outline Plastic (SOIC)
Y-T: Tape and Reel

HIGH RELIABILITY DESIGNATOR
/883: Fully Compliant to MIL-STD-883 Class B/QML
/883B

FX RADIATION HARDENED POWER MOSFET TYPES

FX X XXXX X X

FR: Total Dose Rad Hard Power MOSFET
FS: Single Event Enhanced Rad Hard Power MOSFET

PACKAGE DESIGNATOR
C: Die
E: TO-258AA
F: TO-254AA
K: TO-204AE (TO-3 with 60 mil diameter leads)
L: TO-205AF (TO-39 with Low Profile Cap)
M: TO-204AA (TO-3 with 40 mil diameter leads)
S: TO-257AA
X: 18 Lead LCC

DIE DESIGNATOR
All Numeric Characters
N-Channel (Three Digits) - XXX
P-Channel (Four Digits) - 9XXX

RADIATION (TOTAL DOSE) ASSURANCE LEVEL
D: 10K RAD(Si)
R: 100K RAD(Si)
H: 1000K RAD(Si)
(Not Available in the FS Series)

RELIABILITY SCREENING LEVEL
1: Non-TX (Commercial)
2: TX Equivalent of MIL-S-19500
3: TXV Equivalent of MIL-S-19500
4: Space Equivalent of MIL-S-19500

NOTE: This nomenclature must be used to order any 2N7XXX Radiation Hardended MOSFET product.

HX "OLD" TYPES

H A 1 - 5134 -2

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
D: Digital
I: Interface
M: Memory
V: Analog High Voltage

PACKAGE DESIGNATOR
1: Ceramic Dual-In-Line Frit-Seal (CERDIP)
1B: Ceramic Dual-In-Line Metal-Seal (SBDIP)
2: Can
3: Dual-In-Line Plastic (PDIP)
4: Ceramic Leadless Chip Carriers (CLCC)
4P: Plastic Leaded Chip Carrier (PLCC)
6: Narrow Dual-In-Line Plastic (PDIP) or Ceramic Dual-In-Line Frit-Seal (CERDIP)
7: 8 Lead Ceramic Dual-In-Line Frit-Seal (CERDIP)
9P: Small Outline Plastic (SOIC)
0: Chip

NOTE: If the package designator is 2 characters the hyphen is omitted from the part number.

PART NUMBER

PERFORMANCE GRADE
A, B: High Performance
C: Relaxed Specification
S: Very High Speed

NOTE: Applies to HA, HD and HM products only.

SUFFIX
96: Tape and Reel Option for SOIC, PLCC
X96: Tape and Reel Option for SOIC, PLCC

TEMPERATURE GRADE
-2: -55°C to 125°C
-4: -25°C to 85°C
-5: 0°C to 75°C
-6: 25°C Chip Probe
-7: Dash-7 High Reliability Commercial Product 0°C to 75°C, includes 96 hour Burn-In
-8: -55°C to 125°C Harris Class B Equivalent Devices for use in Military and Flight Systems
-9: -40°C to 85°C
/883: Fully Compliant to MIL-STD-883, Class B/QML
BXXXX: Customer Specific Screening
RXXXX: Customer Specific Screening
SXXXX: Customer Specific Screening

HX, HXX "NEW" TYPES

H A 4314B C B 96

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
FA: Ultra-High Frequency Analog
I: Data Acquisition
IN: Interface
V: Analog High Voltage

PART NUMBER

TEMPERATURE
C: 0°C to 70°C
I: -40°C to 85°C
M: -55°C to 125°C

PACKAGE DESIGNATOR
A: Shrink Small Outline Plastic (SSOP)
B: Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
H: Plastic Small Outline Transistor (SOT)
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
L: Ceramic Leadless Chip Carrier (CLCC)
M: Plastic Leaded Chip Carrier (PLCC)
N: Thin Quad Flatpack (TQFP), or Metric Quad Flatpack (MQFP)
Q: Metric Plastic Quad Flatpack (MQFP), or Plastic Quad Flatpack (PQFP)
P: Dual-In-Line Plastic (PDIP)
T: Can
Y: Chip (Commercial Visual)
W: Wafer

SUFFIX
/883: Fully Compliant to MIL-STD-883 Class B/QML
96: Tape and Reel
-T: Tape and Reel

MSP Ordering Nomenclature

HCS, HCTS, ACS, ACTS, RADIATION HARD TYPES

HCSXXX D MS R

PART NUMBER
ACS, HCS: CMOS Compatible
ACTS, HCTS: TTL Compatible

PACKAGE DESIGNATOR
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
H: Die
K: Ceramic Flatpack

CLASS
MS: Class V (Note 1)

SAMPLE
/SAMPLE: 25°C Temperature Tested (Note 2)

HARDNESS ASSURANCE LEVEL
R: 2×10^5 (200K RADS)

NOTES:
1. FLIGHT UNITS MUST BE ORDERED BY SMD#.
   A cross reference table is available on the Harris website at http://www.semi/harris.com/datasheets/smd/smd_xref.
2. /SAMPLE available for design-in/breadboarding - NOT FOR FLIGHT.

HIP TYPES

PART NUMBER

H I P 2 5 0 0 I P

PREFIX
H: Harris

FAMILY
IP: Intelligent Power
V: High Voltage

TOPOLOGY
0: Low Side Switch
1: High Side Switch
2: Half Bridge
3: Reserved for future use
4: Full Bridge
5: Regulator/Power Supply
6: PWM Controller
7: Multiplex Communication Circuit
8: Audio Specific Circuits
9: Special Function

VOLTAGE
Multiply by 10 for Capability (i.e., 50 = 500V)
If Negative (-) is Used for First Digit, Do Not Multiply by 10 (i.e., -5 = 5V)

SEQUENTIAL NUMBER
Based on Order of Development 0-9

TEMPERATURE
A: Automotive (-40°C to 150°C)
C: Commercial (0°C to 70°C)
I: Industrial (-40°C to 85°C)
M: Military (-55°C to 125°C)
D: EDP (0°C to 85°C)

PACKAGE DESIGNATOR
B: Small Outline Plastic (SOIC)
D: Chip
M: Plastic Leaded Chip Carrier (PLCC)
P: Dual-In-Line Plastic (PDIP)
Q: Metric Plastic Quad Flatpack (MQFP)
S: Single-In-Line Plastic (SIP)
W: Wafer
Y: Die

HMU/HMA TYPES

H MU 16 J C - 35 /883

PREFIX
H: Harris

FAMILY
MU: Multiplier
MA: Multiplier/ Accumulator

DEVICE TYPE
16, 17, 510

PACKAGE DESIGNATOR
J: Plastic Leaded Chip Carrier (PLCC)
G: Ceramic Pin Grid Array (CPGA)

TEMPERATURE RANGE
C: Commercial, 0°C to 70°C
I: Industrial, -40°C to 85°C
M: Military, -55°C to 125°C

PERFORMANCE GRADE
-35: 35ns -60: 60ns
-45: 45ns -65: 65ns
-55: 55ns -75: 75ns

HIGH RELIABILITY DESIGNATOR
883: -55°C to 125°C Fully Compliant to MIL-STD-883, Class B/QML

HS RADIATION HARDENED TYPES

H S 1 - 6617 RH -8

PREFIX
H: Harris

FAMILY
Rad Hard/High-Rel Products

PACKAGE DESIGNATOR
- 1: Ceramic Dual-In-Line Frit-Seal (CERDIP) or Ceramic Dual-In-Line Metal-Seal (SBDIP)
- 2: Can
- 4: Ceramic Leadless Chip Carriers (CLCC)
- 7: 8 Lead Ceramic Dual-In-Line Frit-Seal (CERDIP)
- 8: Ceramic Pin Grid Array (CPGA)
- 9: Ceramic Flatpack
- 0: Die

PART NUMBER

HARDNESS
RH: Radiation Hardened (Note 3)

TEMPERATURE GRADE
- -8: -55°C to 125°C QML SMD Class Q (Note 1)
- -Q: -55°C to 125°C QML SMD Class V (Note 1)
- /SAMPLE: 25°C Temperature Tested (Note 2)
- /PROTO: -55°C to 125°C Temperature Tested (Note 2)

NOTES:

1. FLIGHT UNITS MUST BE ORDERED BY SMD#. A cross reference table is available on the Harris website at http://www.semi/harris.com/datasheets/smd/smd_xref.
2. /SAMPLE and /PROTO available for design-in/breadboarding - NOT FOR FLIGHT.
3. Refer to specific device type SMD for radiation hardness level.

HSP TYPES

H SP XXXXX J C - XX /883

PREFIX
H: Harris

FAMILY
SP: Signal Processing

DEVICE TYPE
- 43XXX: Digital Filters
- 45XXX: Signal synthesis/Special Function
- 48XXX: Image Processing
- 95XX: Building Blocks
- 50XXX: Freq. Conversion and Modulation/ Demodulation

PACKAGE DESIGNATOR
- D: Die
- G: Ceramic Pin Grid Array (CPGA)
- J: Plastic Leaded Chip Carrier (PLCC)
- P: Dual-In-Line Plastic (PDIP)
- S: Small Outline Plastic (SOIC)
- V: Meteric Quad Flat Pack (MQFP)
- W: Wafer

TEMPERATURE RANGE
- C: Commercial, 0°C to 70°C
- I: Industrial, -40°C to 85°C
- M: Military, -55°C to 125°C

SPEED GRADE IN MHz

HIGH-RELIABILITY DESIGNATOR
/883: -55°C to 125°C Fully Compliant to MIL-STD-883, Class B/QML

NOTE: Suffix EV, EVAL: Evaluation Kit (Available for some products)

MSP Ordering Nomenclature

ICL, ICM TYPES

ICL 8069D C B A T

DEVICE FAMILY
ICL
ICM

PART NUMBER

TEMPERATURE RANGE
C: Commercial, 0°C to 70°C
I: Industrial, -25°C to 85°C or -40°C to 85°C (Specified on Data Sheet)
M: Military, -55°C to 125°C

PACKAGE DESIGNATOR
B: Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
F: Ceramic Flatpack
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
M: Metric Plastic Quad Flatpack (MQFP)
P: Plastic Dual-In-Line
S: TO-52 Can
T: Can (TO-99, TO-100)
Z: TO-92 (Plastic)
/W: Wafer
/D: Chip

SUFFIX
/883B: Fully Compliant to MIL-STD-883 Class B/QML
T: Tape and Reel

PIN COUNT DESIGNATOR

SUFFIX	PIN COUNT	DIAMETER
A	8	
B	10	
C	12	
D	14	
E	16	
F	22	
G	24	
H	42	
I	28	
J	32	
K	35	
L	40	
N	18	
P	20	
Q	2	
R	3	
V	8	0.200″ pin circle, isolated case
W	10	0.230″ pin circle, isolated case
X	10	0.230″ pin circle, case to pin 5
Y	8	0.200″ pin circle, case to pin 4
Z	8	0.230″ pin circle, case to pin 5
44	44	

IH TYPES

IH 5043 M J E /883B

DEVICE FAMILY
Interface

PART NUMBER

TEMPERATURE RANGE
C: Commercial, 0°C to 70°C
I: Industrial, -40°C to 85°C
M: Military, -55°C to 125°C

PACKAGE DESIGNATOR
B: Small Outline Plastic (SOIC)
Y: Narrow Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
P: Dual-In-Line Plastic (PDIP)
T: Can

SUFFIX
/883B: -55°C to 125°C Fully Compliant to MIL-STD-883, Class B/QML
/HR: -55°C to 125°C, Non-Compliant
/BI: With Burn-In
T: Tape and Reel

PIN COUNT DESIGNATOR
A: 8
D: 14
E: 16
P: 20
W: 10 (0.230" pin circle isolated case)

JM JAN-QML TYPES

JM38510/ 051 51 B C A

- **GENERAL SPECIFICATIONS**
- **DEVICE FAMILY**
- **SPECIFIC DEVICE**
- **DEVICE CLASS**
  B: Class B/QML
- **PACKAGE DESIGNATOR**
  See Specific Data Sheets
- **LEAD FINISH**
  A: Solder
  C: Gold

SP TYPES

SP 720 A P T

- **PREFIX**
  SP: Smart Power
- **PART NUMBER**
  Protection Device
- **TEMPERATURE**
  A: Automotive (-40°C to 150°C)
  C: Commercial (0°C to 70°C)
  I: Industrial (-40°C to 85°C)
  M: Military (-55°C to 125°C)
  D: EDP (0°C to 85°C)
- **PACKAGE DESIGNATOR**
  B: Small Outline Plastic (SOIC)
  C: Thin Shrink Small Outline Plastic (SSOP)
  D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
  M: Ceramic Leadless Chip Carrier (CLCC)
  P: Plastic DIP (PDIP)
  S: Single-In-Line Plastic (SIP)
  W: Wafer
- **SUFFIX**
  -T: Tape and Reel

VARISTORS, DESC QUALIFIED AND STANDARD DRAWING TYPES

M83530/1- XXXX

- M83530/1: Full QPL LA Series MOV
  87063: Standard Part Drawing for ZA Series
  90065: Standard Part Drawing for DB Series
- **ELECTRICAL VARIANT**

V (TX EQUIVALENT) TYPES

V 130 LTX 10 A

- V = Metal-Oxide Varistor (MOV)
- LA Series - MAX RMS Applied Voltage
  ZA Series - V_N (DC) Nominal Varistor Voltage
- LTX = LA Series
  ZTX = ZA Series
- Relative Energy Indicator
- LA Series ONLY:
  A, B - Clamping Voltage Options

Military Selection Guide

DESCRIPTION	BASE PART #	SCREENING LEVEL		
ANALOG SIGNAL PROCESSING				
ARRAYS, DIODE/TRANSISTOR				
Diode Array, 6, 5V, 1.0ns	CA3039	N		
NPNs (5), 8GHz	HFA3127	/883		SMD
NPNs (2), Plus Darlington Pair, 120MHz	CA3018A	N		
NPNs (3), Plus Darlington Pair, 120MHz	CA3045	N		
NPNs (5), Matched, 100mA	CA3083	N		
NPNs (7), Common Emitter, 100mA	CA3081	N		
BUFFERS				
Buffer, 850MHz, Programmable Gain	HFA1112	/883		
Buffer, 850MHz, Programmable Gain, V_{OUT} Limited	HFA1113	/883		SMD
Buffer, 750MHz, 1300V/µs	HFA1110	/883		SMD
Buffer, 250MHz, 100V/µs	HA-5033	/883		SMD
Buffer, 225MHz, Programmable Gain, V_{OUT} Limited	HFA1115	/883		
Buffer, 110MHz, 1300V/µs	HA-5002	/883		SMD
Dual Buffer, 340MHz, Programmable Gain	HFA1212	/883		
Quad Buffer, 225MHz, Programmable Gain	HFA1412	/883		
COMPARATORS				
Dual, General Purpose, BiMOS	CA3290A	N		
Quad, Precision	HA-4902	/883		SMD
DIFFERENTIAL AMPLIFIERS				
Single, Diff/Cascode, 120MHz	CA3028A,B	N		
Dual, 500MHz, Low Power	CA3049	N		
MULTIPLIERS				
Multiplier, 2-Quadrant, Voltage Output	HA-2546	/883		SMD
Multiplier, 4-Quadrant, Current Output	HA-2557	/883		
Multiplier, 4-Quadrant, Voltage Output	HA-2556	/883		SMD
OPERATIONAL AMPLIFIERS, SINGLE				
Single, 12MHz, 60Vµs	HA-2510	/883	JAN	
Single, 12MHz, 60V/µs	HA-2512	/883		
Single, 20MHz, 150V/µs	HA-2529	/883		SMD
Single, 20MHz, 120V/µs	HA-2520	/883	JAN	SMD
Single, 20MHz, 120V/µs	HA-2522	/883		SMD
Single, 40MHz, 250V/µs	HA-2541	/883		SMD
Single, 50MHz, 240V/µs	HA-2841	/883		
Single, 50MHz, 150V/µs, Video	HA-2544	/883		SMD
Single, 70MHz, 350V/µs, 100mA Out	HA-2542	/883		SMD
Single, 80MHz, 400V/µs, 100mA Out	HA-2842	/883		SMD
Single, 80MHz, 20V/µs, Precision	HA-2620	/883	JAN	
Single, 80MHz, 20V/µs, Precision	HA-2622	/883		
Single, 100MHz, 1200V/µs	HA-5004	/883		
Single, 100MHz, 1100V/µs	HA-5020	/883		SMD
Single, 100MHz, 120V/µs	HA-5160	N		

N = Non-Compliant, /883 = QML Class Q, JAN = Slash Sheets, SMD = Standard Military Drawing, MIL-S-19500 = JAN Slash Sheets

DESCRIPTION	BASE PART #	SCREENING LEVEL		
Single, 100MHz, 35V/µs, 0.75mV V_{IO}	HA-5221	/883		SMD
Single, 150MHz, 160V/µs	HA-5190	/883		SMD
Single, 150MHz, 120V/µs, Precision	HA-2548	/883		SMD
Single, 360MHz, 1200V/µs, V_{OUT} Limit	HFA1135	/883		SMD
Single, 360MHz, 1000V/µs, Disable	HFA1145	/883		
Single, 400MHz, 400V/µs	HA-2540	/883		SMD
Single, 400MHz, 340V/µs	HA-2850	/883		
Single, 600MHz, 2000V/µs, Comp.pin	HFA1102	/883		
Single, 600MHz, 625V/µs	HA-2839	/883		
Single, 600MHz, 625V/µs	HA-2840	/883		
Single, 600MHz, 600V/µs	HA-2539	/883		SMD
Single, 850MHz, 2300V/µs	HFA1100	/883		SMD
Single, 850MHz, 2300V/µs, with Balance Pins	HFA1120	/883		SMD
Single, 850MHz, 2300V/µs, V_{OUT} Limit	HFA1130	/883		SMD
Single, General Purpose	HA-2700	N		
Single, General Purpose, BiMOS	CA3130,A	N		
Single, General Purpose, BiMOS	CA3140,A	N		
Single, General Purpose, BiMOS	CA3160,A	N		
Single, General Purpose, Low Cost	CA741	N		
Single, General Purpose/Precision	HA-2500	/883	JAN	
Single, General Purpose/Precision	HA-2502	/883		
Single, General Purpose/Precision	HA-2600	/883	JAN	
Single, General Purpose/Precision	HA-2602	/883		
Single, General Purpose/Wideband	CA3100	N		
Single, High Voltage, ±35V_{OUT}	HA-2640	/883		SMD
Single, Low Noise, 100MHz, 50V/µs	HA-5111	/883		SMD
Single, Low Noise, 10MHz, 10V/µs	HA-5101	/883		SMD
Single, OTA, Adjustable Gain	CA3080A	N		
Single, Precision, 0.005mV V_{IO}	ICL7650S	N		
Single, Precision, 0.025mV V_{IO}	HA-5130	N		
Single, Precision, 0.06mV V_{IO}	HA-5177	/883		
Single, Precision, 0.1mV V_{IO}	HA-5127	/883		SMD
Single, Precision, 0.1mV, 120MHz	HA-5147	/883		SMD
Single, Precision, 0.1mV, 63MHz	HA-5137	/883		SMD
Single, 24V/36V Prog. Power Switch	CA3094,A	N		
OPERATIONAL AMPLIFIERS, DUAL				
Dual, 9MHz, 125V/µs	CA3280A	N		
Dual, 100MHz, 35V/µs, 0.75mV V_{IO}	HA-5222	/883		SMD
Dual, 125MHz, 475V/µs	HA5023	/883		
Dual, 125MHz, 475V/µs, Disable	HA5022	/883		
Dual, 530MHz, 1050V/µs, Disable	HFA1245	/883		
Dual, General Purpose, BiMOS	CA3260,A	N		
Dual, Low Noise, 60MHz, 20V/µs	HA-5112	/883		SMD
Dual, Low Noise, 8MHz, 3V/µs	HA-5102	/883		SMD

N = Non-Compliant, /883 = QML Class Q, JAN = Slash Sheets, SMD = Standard Military Drawing, MIL-S-19500 = JAN Slash Sheets

DESCRIPTION	BASE PART #	SCREENING LEVEL		
Dual, Low Power, 0.15mA	HA-5142	/883		SMD
Quad, General Purpose	HA-4741	/883		
OPERATIONAL AMPLIFIERS, QUAD				
Quad, Low Noise, 60MHz, 20V/µs	HA-5114	/883		SMD
Quad, Low Noise, 8MHz, 3V/µs	HA-5104	/883		SMD
Quad, Low Power, 0.15mA	HA-5135	/883		
Quad, Low Power, 0.15mA	HA-5144	/883		SMD
Quad, Precision, 0.2mV V_{IO}	HA-5134	/883		SMD
Quad, Precision, 0.3mV V_{IO}	HA-5170	N		
4-Channel Selectable, Low Power	HA-2400	/883		SMD
4-Channel Selectable, Video	HA-2444	/883		SMD
SAMPLE AND HOLD AMPLIFIERS				
Sample and Hold, 10MHz, 700ns	HA-5340	/883		SMD
Sample and Hold, 4.5MHz, 650ns	HA-5330	/883		SMD
Sample and Hold, 2.5MHz, 3.2µs	HA-2420	/883		SMD
Sample and Hold, 2.0MHz, 1.0µs	HA-5320	/883		SMD
TELECOM				
CVSD, Digital Voice Encode/Decode	HC-55564	/883		
4 x 4, 16 Analog Switches	CD22100	/883		
4 x 4 x 2, 16 Pairs of Analog Switches	CD22101	/883		
TIMERS				
Dual Timer, CMOS, General Purpose	ICM7556	/883		SMD
Timer, CMOS, General Purpose	ICM7555	/883		SMD
WAVEFORM GENERATOR				
Waveform Gen, 300kHz, Pulse/Tri/Sine	ICL8038	/883		SMD
DATA ACQUISITION				
A/D CONVERTERS				
12-Bit, 8ms A/D with µP Interface	HI-774S	/883		
12-Bit, 8ms A/D with µP Interface	HI-774T	/883		
12-Bit, 8ms A/D with µP Interface	HI-774U	/883		
12-Bit, 12ms A/D with µP Interface	HI-674AS	/883		
12-Bit, 12ms A/D with µP Interface	HI-674AT	/883		
12-Bit, 12ms A/D with µP Interface	HI-674AU	/883		
12-Bit, 25ms A/D with µP Interface	HI-574AS	/883		
12-Bit, 25ms A/D with µP Interface	HI-574AT	/883		SMD
12-Bit, 25ms A/D with µP Interface	HI-574AU	/883		SMD
12-Bit, A/D with µP Interface	ICL7109	/883		
6-Bit, 30MHz, Flash A/D	HI-5701T	/883		
6-Bit, 15,10MHz, Flash A/D	CA3306	N		
D/A CONVERTERS				
12-Bit, 4MHz, D/A with Reference	HI-565A	/883		
10-Bit, Multiplying D/A	AD7520S,U	/883		
DISPLAY DRIVERS				
LED Display Driver, Common Anode	ICL7228A	/883		
LED Display Driver, Common Anode	ICL7228C	/883		

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
LED Display Driver, Common Cathode	ICL7228B	/883		
LED Display Driver, Common Cathode	ICL7228D	/883		
MULTIPLEXERS				
Single 4 Channel, Video / Wideband	HI-0524	/883		SMD
Single 8 Channel	DG408	/883		SMD
Single 8 Channel	DG508A	/883		
Single 8 Channel	HI-0508	/883	JAN	SMD
Single 8 Channel	IH6108	/883		
Single 8 Channel, Latchable	DG528	/883		
Single 8 Channel, OV Protection	HI-0508A	N		
Single 8 Channel, OV Protection, R_{ON} Match	HI-0548	/883	JAN	SMD
Single 8 Channel, Precision	HI-1818A	/883		
Single 8 or Differential 4 Selectable	HI-0518	N		
Single 16 Channel	DG406	/883		
Single 16 Channel	DG506A	/883		
Single 16 Channel	HI-0506	/883	JAN	SMD
Single 16 Channel, Latchable	DG526	/883		
Single 16 Channel, OV Protection	HI-0506A	N		
Single 16 Channel, OV Protection, R_{ON} Match	HI-0546	/883	JAN	SMD
Single 16 or Differential 8 Selectable	HI-0516	/883		SMD
Differential 4 Channel	DG409	/883		SMD
Differential 4 Channel	DG509A	/883		
Differential 4 Channel	HI-509	/883	JAN	SMD
Differential 4 Channel	IH6208	/883		
Differential 4 Channel, Latchable	DG529	/883		
Differential 4 Channel, OV Protection	HI-0509A	N		
Differential 4 Channel, OV Protection, R_{ON} Match	HI-0549	/883	JAN	SMD
Differential 4 Channel, Precision	HI-0539	N		
Differential 4 Channel, Precision	HI-1828A	/883		
Differential 8 Channel	DG407	/883		
Differential 8 Channel	DG507A	/883		
Differential 8 Channel	HI-0507	/883	JAN	SMD
Differential 8 Channel, Latchable	DG527	/883		
Differential 8 Channel, OV Protection	HI-0507A	N		
Differential 8 Channel, OV Protection, R_{ON} Match	HI-0547	/883	JAN	SMD
SWITCHES				
SPDT	DG187A	/883		
SPDT	DG188A	/883		
SPDT	DG301A	/883	JAN	
SPDT	HI-301	/883		
SPDT	HI-305	/883		
SPDT	HI-387	/883		
SPDT	HI-5042	/883		SMD
SPDT	HI-5050	/883		SMD

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
SPDT	IH5042		JAN	
SPDT	IH5142	/883		
SPST	HI-5040	/883		SMD
SPST	IH5040		JAN	
SPST	IH5140	/883		
4PST	HI-5047	/883		SMD
4PST	HI-5047A	/883		SMD
DPDT	HI-5046	/883		SMD
DPDT	HI-5046A	/883		SMD
DPST	HI-5044	/883		SMD
DPST	IH5044		JAN	
DPST	IH5144	/883		SMD
Dual SPST	DG181A	/883		
Dual SPST	DG182A	/883		
Dual SPST	DG191A	/883		
Dual SPST	DG200	/883		
Dual SPST	DG300A	/883	JAN	
Dual SPST	DG401	/883		SMD
Dual SPST	HI-200	/883		
Dual SPST	HI-300	/883		
Dual SPST	HI-304	/883		
Dual SPST	HI-5041	/883		SMD
Dual SPST	HI-5048	/883		SMD
Dual SPST	IH5041		JAN	
Dual SPST	IH5141	/883		
Dual SPST, RF/Video	IH5341	/883		
Dual SPST, Video	HI-222	/883		SMD
Dual SPDT	DG190A	/883		
Dual SPDT	DG303A	/883	JAN	
Dual SPDT	DG403	/883		SMD
Dual SPDT	HI-303	/883		
Dual SPDT	HI-307	/883		
Dual SPDT	HI-381	/883		
Dual SPDT	HI-390	/883		
Dual SPDT	HI-5043	/883		SMD
Dual SPDT	HI-5051	/883		SMD
Dual SPDT	IH5043	/883	JAN	SMD
Dual SPDT	IH5143	/883		SMD
Dual SPDT	IH5151	/883		SMD
Dual DPST	DG184A	/883		
Dual DPST	DG185A	/883		
Dual DPST	DG302A	/883	JAN	
Dual DPST	DG405	/883		SMD
Dual DPST	HI-302	/883		

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
Dual DPST	HI-306	/883		
Dual DPST	HI-384	/883		
Dual DPST	HI-5045	/883		SMD
Dual DPST	HI-5049	/883		SMD
Dual DPST	IH5045		JAN	SMD
Dual DPST	IH5145	/883		
Quad SPST	DG201	/883		
Quad SPST	DG201A	/883	JAN	SMD
Quad SPST	DG202	/883		
Quad SPST	DG308A	/883		
Quad SPST	DG309	/883		
Quad SPST	DG411	/883		SMD
Quad SPST	DG412	/883		SMD
Quad SPST	DG413	/883		SMD
Quad SPST	DG441	/883		SMD
Quad SPST	DG442	/883		SMD
Quad SPST	HI-201	/883		SMD
Quad SPST	HI-201HS	/883		SMD
Quad SPST, RF/Video	IH5352	/883		SMD
Quad SPST/SPDT, TTL	IH5012	/883		
VOLTAGE REFERENCE				
1.2V Voltage Reference, 100ppm	ICL8069D	/883		
1.2V Voltage Reference, 50ppm	ICL8069C	/883		
DIGITAL				
MEMORY, SRAMs				
256 x 4, 220ns, 10µA, Output Latches	HM-6551	/883		
256 x 4, 220ns, 10µA, Common I/O	HM-6561	/883		
256 x 4, 250ns, 500µA, Asynchronous	CDP1822	N		
32 x 8, 320ns, 50µA, Asynchronous	CDP1824	N		
128 x 8, 360ns, 270µA, Asynchronous	CDP1823	N		
1K x 1, 190ns, 260µA, Asynchronous	CDP1821	N		
1K x 1, 180ns, 5µA, Three-State	HM-6518	/883		
1K x 1, 180ns, 5µA	HM-6508	/883		
1K x 4, 120ns, 50µA, Three-State	HM-6514	/883		
1K x 4, 120ns, 25µA, Three-State	HM-6414			SMD
4K x 1, 120ns, 25µA, Three-State	HM-6504	/883		SMD
2K x 8, 70ns, 20µA, Asynchronous	HM-65162	/883		SMD
2K x 8, 120ns, 25µA, Low Power	HM-6516	/883		SMD
16K x 1, 70ns, 20µA, Asynchronous	HM-65262	/883		SMD
8K x 8, 150ns, 75µA, Asynchronous	HM-65642	/883		
MEMORY, PROMS				
512 x 8, 120ns, 100µA	HM-6642	/883		SMD
2K x 8, 90ns, 100µA	HM-6617	/883		SMD

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
MICROPROCESSORS				
16-Bit, 12.5MHz	80C286	/883		SMD
16-Bit, 8MHz	80C86	/883		SMD
8/16-Bit, 8MHz	80C88	/883		SMD
8-Bit, CPU, 3.2MHz or 6.4MHz	CDP1802	N		
MICROCONTROLLER				
16-Bit, 10MHz, 100ns, Forth Language	RTX2000	/883		
PERIPHERALS, DATA BUS				
Bit Rate Generator, Prog, 9600 Baud	HD-4702	/883		SMD
Bus Arbitor, 8MHz,1mA/MHz	82C89			SMD
Bus Controller, 8MHz, 1mA/MHz	82C88			SMD
Bus Driver, Differential, ARINC 429	HS-3182			SMD
Bus Driver, Inverting, Octal, Latching, 25ns	82C83H			SMD
Bus Driver, Octal, Latching, 35ns	82C82			SMD
Bus Interface, Differential, ARINC 429	HS-3282			SMD
Bus Transceiver, Inverting, Octal, 35ns	82C87H			SMD
Bus Transceiver, Octal, 35ns	82C86H			SMD
Clock Generator	82C284	/883		
Clock Generator Driver, 8MHz	82C84A			SMD
Clock Generator/Controller, 8MHz	82C85	N		
DMA Controller, 12.5MHz	82C37A			SMD
Manchester Encoder/Decoder, 2.50MHz, Enhanced	HD-15531	/883		SMD
Manchester Encoder/Decoder, 1.25MHz	HD-15530			SMD
Manchester Encoder/Decoder, 1MHz	HD-6409	/883		SMD
Serial Controller Interface, 1M Baud	82C52			SMD
UART, 8MHz	HD-6402	/883		SMD
UART, Two Modes	CDP1853	N		
UART, with Baud Rate Generator	82C50A	N		
PERIPHERALS, µPROCESSOR				
DMA Controller, 12.5MHz, Enhanced	82C237			SMD
I/O Port, 5.5MHz	CDP1852	N		
N-Bit 1 of 8 Decoder	CDP1853	N		
Peripheral Interface, Prog, 8MHz	82C55A			SMD
Priority Interrupt Controller,12.5MHz	82C59A			SMD
Real Time Clock, Battery Back-up	ICM7170	/883		SMD
Timer, Interval, Prog, 10MHz	82C54			SMD
DIGITAL SIGNAL PROCESSING				
Address Sequencer, 40MHz	HSP45240	/883		
Binary Correlator, 25MHz	HSP45256	/883		
Convolver, 2-Dimension, 3 x 3, 27MHz	HSP48908	/883		SMD
Filter, 8 Bit FIR, 25.6MHz, 4-Tap	HSP43481	/883		
Filter, 8 Bit FIR, 25.6MHz, 8-Tap	HSP43881	/883		
Filter, 9 Bit FIR, 25.6MHz, 8-Tap	HSP43891	/883		SMD
Filter, Decimating Digital, 25MHz	HSP43220	/883		

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
Filter, Dual Digital, 33MHz	HSP43168	/883		
Frequency Synthesizer, 16 Bit, 15MHz	HSP45116	/883		
Frequency Synthesizer, 16 Bit, 25MHz	HSP45106	/883		
Histogrammer, 33MHz	HSP48410	/883		SMD
Multiplier, 16 x 16 Digital, 45ns	HMU16	/883		
Multiplier, 16 x 16 Digital, 45ns	HMU17	/883		
Multiplier/Acc,16 x 16 Digital, 75MHz	HMA510	/883		
DISCRETE POWER MOSFETS				
MOSFETs, N-CHANNEL				
100V, 3.5A, 15W, 0.6Ω, TO-205AF	2N6782TX	MIL-S-19500/556		
100V, 3.5A, 15W, 0.6Ω, TO-205AF	2N6782TXV	MIL-S-19500/556		
100V, 6A, 20W, 0.3Ω, TO-205AF	2N6788TX	MIL-S-19500/555		
100V, 6A, 20W, 0.3Ω, TO-205AF	2N6788TXV	MIL-S-19500/555		
100V, 8A, 25W, 0.18Ω, TO-205AF	2N6796TX	MIL-S-19500/557		
100V, 8A, 25W, 0.18Ω, TO-205AF	2N6796TXV	MIL-S-19500/557		
100V, 14A, 75W, 0.18Ω, TO-204AA	2N6756TX	MIL-S-19500/542		
100V, 14A, 75W, 0.18Ω, TO-204AA	2N6756TXV	MIL-S-19500/542		
100V, 14A	89009-2N7119TX			SMD
100V, 14A	89009-2N7119TXV			SMD
100V, 14A	89025-2N7241TX			SMD
100V, 14A	89025-2N7241TXV			SMD
180V, 34A, 150W, 0.07Ω, TO-254AA	2N7224TX	MIL-S-19500/592		
180V, 34A, 150W, 0.07Ω, TO-254AA	2N7224TXV	MIL-S-19500/592		
100V, 38A, 150W, 0.055Ω, TO-204AE	2N6764TX	MIL-S-19500/543		
100V, 38A, 150W, 0.055Ω, TO-204AE	2N6764TXV	MIL-S-19500/543		
100V, 38A	89007-2N7123TX			SMD
100V, 38A	89007-2N7123TXV			SMD
200V, 3.5A, 20W, 0.8Ω, TO-205AF	2N6790TX	MIL-S-19500/555		
200V, 3.5A, 20W, 0.8Ω, TO-205AF	2N6790TXV	MIL-S-19500/555		
200V, 5.5A, 25W, 0.4Ω, TO-205AF	2N6798TX	MIL-S-19500/557		
200V, 5.5A, 25W, 0.4Ω, TO-205AF	2N6798TXV	MIL-S-19500/557		
200V, 9A, 75W, 0.4Ω, TO-204AA	2N6758TX	MIL-S-19500/542		
200V, 9A, 75W, 0.4Ω, TO-204AA	2N6758TXV	MIL-S-19500/542		
200V, 9A	89009-2N7120TX			SMD
200V, 9A	89009-2N7120TXV			SMD
200V, 9A	89025-2N7242TX			SMD
200V, 9A	89025-2N7242TXV			SMD
200V, 2.25A, 15W, 1.5Ω, TO-205AF	2N6784TX	MIL-S-19500/556		
200V, 2.25A, 15W, 1.5Ω, TO-205AF	2N6784TXV	MIL-S-19500/556		
200V, 27.4A, 150W, 0.1Ω, TO-254AA	2N7225TX	MIL-S-19500/592		
200V, 27.4A, 150W, 0.1Ω, TO-254AA	2N7225TXV	MIL-S-19500/592		
200V, 30A, 150W, 0.085Ω, TO-204AE	2N6766TX	MIL-S-19500/543		
200V, 30A, 150W, 0.085Ω, TO-204AE	2N6766TXV	MIL-S-19500/543		
200V, 30A	89007-2N7124TX			SMD
200V, 30A	89007-2N7124TXV			SMD

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
400V, 2A, 20W, 1.8Ω, TO-205AF	2N6792TX	MIL-S-19500/555		
400V, 2A, 20W, 1.8Ω, TO-205AF	2N6792TXV	MIL-S-19500/555		
400V, 3A, 25W, 1.0Ω, TO-205AF	2N6800TX	MIL-S-19500/557		
400V, 3A, 25W, 1.0Ω, TO-205AF	2N6800TXV	MIL-S-19500/557		
400V, 5.5A, 75W, 1.0Ω, TO-204AA	2N6760TX	MIL-S-19500/542		
400V, 5.5A, 75W, 1.0Ω, TO-204AA	2N6760TXV	MIL-S-19500/542		
400V, 5A	89009-2N7121TX			SMD
400V, 5A	89009-2N7121TXV			SMD
400V, 5A	89025-2N7243TX			SMD
400V, 5A	89025-2N7243TXV			SMD
400V, 14A, 150W, 0.3Ω, TO-204AA	2N6768TX	MIL-S-19500/543		
400V, 14A, 150W, 0.3Ω, TO-204AA	2N6768TXV	MIL-S-19500/543		
400V, 14A, 150W, 0.315Ω, TO-254AA	2N7227TX	MIL-S-19500/592		
400V, 14A, 150W, 0.315Ω, TO-254AA	2N7227TXV	MIL-S-19500/592		
400V, 14A	89007-2N7125TX			SMD
400V, 14A	89007-2N7125TXV			SMD
400V, 1.25A, 15W, 3.6Ω, TO-205AF	2N6786TX	MIL-S-19500/556		
400V, 1.25A, 15W, 3.6Ω, TO-205AF	2N6786TXV	MIL-S-19500/556		
500V, 1.5A, 20W, 3.0Ω, TO-205AF	2N6794TX	MIL-S-19500/555		
500V, 1.5A, 20W, 3.0Ω, TO-205AF	2N6794TXV	MIL-S-19500/555		
500V, 2.5A, 25W, 1.5Ω, TO-205AF	2N6802TX	MIL-S-19500/557		
500V, 4.5A, 75W, 1.5Ω, TO-204AA	2N6762TX	MIL-S-19500/542		
500V, 4.5A, 75W, 1.5Ω, TO-204AA	2N6762TXV	MIL-S-19500/542		
500V, 4A	89009-2N7122TX			SMD
500V, 4A	89009-2N7122TXV			SMD
500V, 4A	89025-2N7244TX			SMD
500V, 4A	89025-2N7244TXV			SMD
500V, 12A, 150W, 0.4Ω, TO-204AA	2N6770TX	MIL-S-19500/543		
500V, 12A, 150W, 0.4Ω, TO-204AA	2N6770TXV	MIL-S-19500/543		
500V, 12A, 150W, 0.415Ω, TO-254AA	2N7228TX	MIL-S-19500/592		
500V, 12A, 150W, 0.415Ω, TO-254AA	2N7228TXV	MIL-S-19500/592		
500V, 12A	89007-2N7126TX			SMD
500V, 12A	89007-2N7126TXV			SMD
Logic-Level, 100V, 1.69A, 8.33W, 1.4Ω, TO-205AF	2N6901TX	MIL-S-19500/570		
Logic-Level, 100V, 1.69A, 8.33W, 1.4Ω, TO-205AF	2N6901TXV	MIL-S-19500/570		
Logic-Level, 100V, 75A, 12W, 0.2Ω, TO-204AA	2N6902TX	MIL-S-19500/566		
Logic-Level, 100V, 75A, 12W, 0.2Ω, TO-204AA	2N6902TXV	MIL-S-19500/566		
Logic-Level, 200V, 0.98A, 8.33W, 3.65Ω, TO-205AF	2N6903TX	MIL-S-19500/570		
Logic-Level, 200V, 0.98A, 8.33W, 3.65Ω, TO-205AF	2N6903TXV	MIL-S-19500/570		
Logic-Level, 200V, 8A, 75W, 0.65Ω, TO-204AF	2N6904TX	MIL-S-19500/566		
Logic-Level, 200V, 8A, 75W, 0.65Ω, TO-204AF	2N6904TXV	MIL-S-19500/566		
MOSFETs, P-CHANNEL				
100V, 6.5A, 25W, 0.3Ω, TO-205AF	2N6849TX	MIL-S-19500/564		
100V, 6.5A, 25W, 0.3Ω, TO-205AF	2N6849TXV	MIL-S-19500/564		

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
100V, 6A, 60W, 0.6Ω, TO-204AA	2N6896TX	MIL-S-19500/565		
100V, 6A, 60W, 0.6Ω, TO-204AA	2N6896TXV	MIL-S-19500/565		
100V, 12A, 100W, 0.3Ω, TO-204AA	2N6897TX	MIL-S-19500/565		
100V, 12A, 100W, 0.3Ω, TO-204AA	2N6897TXV	MIL-S-19500/565		
100V, 1.5A, 8.33W, 3.65Ω, TO-205AF	2N6895TX	MIL-S-19500/565		
100V, 1.5A, 8.33W, 3.65Ω, TO-205AF	2N6895TXV	MIL-S-19500/565		
100V, 25A, 150W, 0.2Ω, TO-204AE	2N6898TX	MIL-S-19500/565		
100V, 25A, 150W, 0.2Ω, TO-204AE	2N6898TXV	MIL-S-19500/565		
200V, 4A, 25W, 0.8Ω, TO-205AF	2N6851TX	MIL-S-19500/564		
200V, 4A, 25W, 0.8Ω, TO-205AF	2N6851TXV	MIL-S-19500/564		
INTELLIGENT POWER				
MOSFET Driver, 30A, High Voltage	HV400	/883		SMD
Dual MOSFET Driver, 15V	ICL7667	/883		SMD
Voltage Converter, 10V	ICL7660	/883		
Voltage Converter, 12V	ICL7660S	/883		
Voltage Converter, 20V	ICL7662	/883		
Voltage Detector, 1.15V	ICL8211	/883		SMD
Voltage Detector, 1.15V, Inverting	ICL8212	/883		SMD
Voltage Regulator, Positive, Adj, 100mA	CA3085A,B	N		
Voltage Translator, Dual, Low to High	IH6201	/883		
LOGIC, CD4XXX				
BUFFERS/INVERTERS				
Hex Buffer, Non-Inverting	CD4503B	/883		
Hex Buffer/Converter, Inverting	CD4049A		JAN	
Hex Buffer/Converter, Inverting	CD4049UB	/883	JAN	
Hex Buffer/Converter, Non-Inverting	CD4010B	/883		
Hex Buffer/Converter, Non-Inverting	CD4050A		JAN	
Hex Buffer/Converter, Non-Inverting	CD4050B	/883	JAN	
Hex Buffer/Converter, Unbuffered	CD4009UB	/883		
Hex Inverter	CD4069UB	/883	JAN	
Strobed Hex Inverter/Buffer	CD4502B	/883	JAN	SMD
Dual Complementary Pair Plus Inverter, Unbuffered	CD4007UB	/883		
Quad True/Complement Buffer	CD4041UB	/883		
COUNTERS				
Binary Counter, 4-Bit with Asynchronous Clear	CD40161B	/883		
Binary Counter, 4-Bit with Synchronous Clear	CD40174B	/883		
Binary Counter, 4-Bit with Synchronous Clear	CD40163B	/883		
Decade Counter, 4-Bit, with Asynchronous Clear	CD40160B	/883		
Decade Counter/Divider	CD4017A		JAN	
Decade Counter/Divider	CD4017B	/883	JAN	
Divide-By-8 Counter/Divider	CD4022B	/883		
Divide-By N Counter, Presettable	CD4018B	/883	JAN	
Down Counter, Binary, Presettable 8-Bit	CD40103B	/883		
Ripple Counter, 14-Stage Binary	CD4020A		JAN	

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
Ripple Counter, 14-Stage Binary	CD4020B	/883	JAN	
Ripple Counter, 7-Stage Binary	CD4024A		JAN	
Ripple Counter, 7-Stage Binary	CD4024B	/883	JAN	
Ripple Counter/Divider, 14-Stage Binary	CD4060B	/883		
Up Counter, Dual BCD	CD4518B	/883		
Up Counter, Dual Binary	CD4520B	/883		SMD
Up/Down Counter, Presettable	CD40193B	/883		
Up/Down Counter, Presettable	CD4029B	/883		SMD
Up/Down Counter, Presettable 4-Bit BCD	CD4510B	/883		
Up/Down Counter, Presettable 4-Bit Binary	CD4516B	/883		
DECODERS/ENCODERS				
BCD-to-Decimal Decoder	CD4028B	/883		
BCD-to-7 Segment Latch Decoder/Driver	CD4511B	/883		
4-Bit Latch/4-to-16 Line Decoder, Outputs Low	CD4514B	/883		
4-Bit Latch/4-to-16 Line Decoder, Outputs High	CD4515B	/883		SMD
8-Input Priority Encoder	CCD4532B	/883		
Dual 1-of-4 Decoder/DeMUX, Outputs High	CD4555B	/883		SMD
Dual 1-of-4 Decoder/DeMUX, Outputs Low	CD4556B	/883		SMD
FLIP-FLOPS				
4-Bit D Flip-Flop, Three-State Outputs	CD4076B	/883		
Dual D Flip-Flop with Set/Reset Capability	CD4013A		JAN	
Dual D Flip-Flop with Set/Reset Capability	CD4013B	/883	JAN	
Quad D-Type Flip-Flop	CD40175B	/883		
Gated J-K Flip-Flop, Non-Inverting	CD4095B	/883		
Dual J-K Flip-Flop with Set/Reset Capability	CD4027A		JAN	
Dual J-K Flip-Flop with Set/Reset Capability	CD4027B	/883	JAN	
GATES				
Dual 4-Input AND Gate	CD4082B	/883	JAN	SMD
Triple 3-Input AND Gate	CD4073B	/883	JAN	SMD
Quad 2-Input AND Gate	CD4081B	/883	JAN	SMD
Quad AND/OR Select Gate	CD4019A		JAN	
Quad AND/OR Select Gate	CD4019B	/883	JAN	
Dual 2-Input NAND Buffer/Driver	CD40107B	/883		
Dual 4-Input NAND Gate	CD4012B	/883	JAN	
Triple 3-Input NAND Gate	CD4023A		JAN	
Triple 3-Input NAND Gate	CD4023B	/883	JAN	
Quad 2-Input NAND Gate	CD4011A		JAN	
Quad 2-Input NAND Gate	CD4011B	/883	JAN	
Quad 2-Input NAND Gate, Unbuffered	CD4011UB	/883		
8-Input NAND/AND Gate	CD4068B	/883		
Dual 3-Input NOR Gate Plus Inverter	CD4000A		JAN	
Dual 4-Input NOR Gate	CD4002B	/883		SMD
Triple 3-Input NOR Gate	CD4025A		JAN	
Triple 3-Input NOR Gate	CD4025B	/883	JAN	

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
Quad 2-Input NOR Gate	CD4001A			
Quad 2-Input NOR Gate	CD4001B	/883	JAN	
Quad 2-Input NOR Gate, Unbuffered	CD4001UB	/883		
Quad Exclusive NOR Gate	CD4077B	/883		
8-Bit NOR/OR Gate	CD4078B	/883		SMD
Dual 4-Input OR Gate	CD4072B	/883		SMD
Triple 3-Input OR Gate	CD4075B	/883	JAN	
Quad 2-Input OR Gate	CD4071B	/883	JAN	
Quad Exclusive OR Gate	CD4030B	/883	JAN	
Quad Exclusive-OR Gate	CD4070B	/883	JAN	
Multifunction, Expand., 8-Input Gate, Three-State	CD4048B	/883		
Dual 2-Wide 2-Input AND/OR/Invert (AOI) Gate	CD4085B	/883		
4-Wide 2-Input AND/OR/Invert Gate	CD4086B	/883		
Quad 2-Input NAND Schmitt Trigger	CD4093B	/883		SMD
LATCHES				
8-Bit Addressable Latch	CD4099B	/883	JAN	
8-Bit Addressable Latch	CD4724B	/883		
Dual 4-Bit Latch	CD4508B	/883		
Quad Clocked D Latch	CD4042B	/883		
Quad NOR R/S Latch, Three-State Outputs	CD4043B	/883		
Quad NAND R/S Latch, Three-State Outputs	CD4044B	/883		
LEVEL SHIFTERS				
Quad Low-to-High Voltage Interface	CD40109B	/883		
Hex Level Shifter, TTL/CMOS or CMOS/CMOS	CD4504B	/883		
MULTIPLEXERS				
4-Channel Analog MUX/DeMUX	CD4052B	/883		SMD
8-Channel Analog MUX/DeMUX	CD4051B	/883		
8-Channel Data Selector, Three-State Output	CD4512B	/883		
16-Channel Analog MUX/DeMUX	CD4067B	/883		
Triple 2-Channel Analog MUX/DeMUX	CD4053B	/883		SMD
Quad 2-Line to 1-Line Data Selector/MUX	CD40257B	/883		
REGISTERS				
FIFO Buffer Register, 4-Bit x 16 Word	CD40105B	/883		
Shift Register, 4-Stage, Parallel-In/Parallel-Out	CD4035B	/883		SMD
Shift Register, 18-Stage Static	CD4006B	/883		
Dual Shift Register, 64-Bit	CD4517B	/883		
Shift-and-Store Bus Register, 8-Stage	CD4094B	/883		SMD
Static Shift Register, 8-Stage	CD4014B	/883		
Static Shift Register, 8-Stage	CD4021B	/883	JAN	
Static Shift Register, 8-Stage	CD4034B	/883		
Static Shift Register, 64-Stage	CD4031B	/883		
Dual Static Shift Register, 4-Stage	CD4015B	/883		
SWITCHES				
Quad Bilateral Switch	CD4016B	/883		SMD

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
Quad Bilateral Switch, Lower R_{ON}	CD4066B	/883	JAN	
SPECIAL FUNCTION				
4-Bit Full Adder with Parallel Carry-Out	CD4008B	/883		
4-Bit Magnitude Comparator	CD4063B	/883		
4-Bit Magnitude Comparator	CD4585B	/883		SMD
4-Segment Display Driver	CD4054B	/883		
9-Bit Parity Generator/Checker	CD40101B	/883		
BCD To 7-Segment Driver Strobe Latch	CD4056B	/883		
Binary Rate Multiplier	CD4089B	/883		
Dual Monostable Multivibrator	CD4098B	/883	JAN	
Dual Precision Monostable Multivibrator	CD14538B	/883		SMD
Hex Schmitt Trigger	CD40106B	/883		
Look-Ahead Carry Generator	CD40192B	/883		
Micropower Phase-Locked Loop	CD4046B	/883		SMD
Monostable/Astable Multivibrator	CD4047B	/883		SMD
Programmable Timer	CD4536B	/883		
Programmable Timer, with Power-On Reset	CD4541B	/883		
LOGIC, AC (Advanced High Speed CMOS)				
BUFFERS				
Hex Inverter/Buffer	AC04	/883		
Hex Inverter/Buffer with Open Drain	AC05	/883		
COUNTERS				
Presettable Synchronous 4-Bit Counter, Async. Reset	AC161	/883		
Presettable Synchronous 4-Bit Counter, with Reset	AC163	/883		
Presettable Synchronous 4-Bit Up/Down Counter	AC191	/883		
Presettable Synchronous 4-Bit Up/Down Counter	AC193	/883		
DECODERS/ENCODERS				
3-to-8 Decoder/DeMUX, Inverting	AC138	/883		
Dual 2-to-4 Line Decoder/DeMUX	AC139	/883		
FLIP-FLOPS				
Dual J-K Flip-Flop with Set and Reset +Trigger	AC109	/883		
Dual J-K Flip-Flop with Set and Reset -Trigger	AC112	/883		
Dual D Flip-Flop, with S and R, +Trigger	AC74	/883		
Octal D Flip-Flop with Reset, +Trigger	AC273	/883		
Octal D Type Flip-Flop, with +Trigger	AC374	/883		
Octal D Type Flip-Flop, with +Trigger Inverting	AC534	/883		
Octal D Type Flip-Flop, with +Trigger	AC574	/883		
GATES				
Quad 2-Input AND Gate	AC08	/883		
Quad 2-Input NAND Gate	AC00	/883		
Quad 2-Input NOR Gate	AC02	/883		
Quad 2-Input OR Gate	AC32	/883		
LATCHES				
Octal Transparent Latch, Three-State	AC373	/883		

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
MULTIPLEXERS				
Dual 4-Input MUX	AC153	/883		
Quad 2-Input MUX	AC157	/883		
Quad 2-Input MUX, Three-State, Non-Inverting	AC257	/883		
REGISTERS				
8-Bit Serial In/Parallel Out Shift Register	AC164	/883		
8-Bit Shift/Storage Register Three-State, Async. Reset	AC299	/883		
SPECIAL FUNCTION				
4-Bit Full Adder with Fast Carry	AC283	/883		
9-Bit Odd/Even Parity Generator Checker	AC280	/883		
Octal Buffer/Line Driver, Three-State	AC541	/883		
Octal Buffer/Line Driver, Three-State	AC244	/883		
Octal Buffer/Line Driver, Three-State Inverting	AC240	/883		
Octal Transceiver, Three-State	AC245	/883		
Octal Transparent Latch, Three-State	AC573	/883		
LOGIC, ACT (Advanced High Speed CMOS with TTL Inputs)				
BUFFERS				
Hex Inverter/Buffer	ACT04	/883		
Hex Inverter/Buffer with Open Drain	ACT05	/883		
COUNTERS				
Presettable Synchronous 4-Bit Counter, Async. Reset	ACT161	/883		
Presettable Synchronous 4-Bit Counter, with Reset	ACT163	/883		
Presettable Synchronous 4-Bit Up/Down Counter	ACT191	/883		
Presettable Synchronous 4-Bit Up/Down Counter	ACT193	/883		
DECODERS/ENCODERS				
3-to-8 Line Decoder/DeMUX, Inverting	ACT138	/883		
3-to-8 Line Decoder/DeMUX, Non-Inverting	ACT238	/883		
Dual 2-to-4 Line Decoder/DeMUX	ACT139	/883		
FLIP-FLOPS				
Dual J-K Flip-Flop with Set and Reset +Trigger	ACT109	/883		
Dual J-K Flip-Flop with Set and Reset -Trigger	ACT112	/883		
Dual D Flip-Flop, with S and R, +Trigger	ACT74	/883		
Hex D Flip Flop, with Reset	ACT174	/883		
Octal D Flip-Flop with Reset, +Trigger	ACT273	/883		
Octal D Type Flip-Flop, with +Trigger	ACT374	/883		
Octal D Type Flip-Flop, with +Trigger Inverting	ACT534	/883		
Octal D Type Flip-Flop, with +Trigger	ACT574	/883		
GATES				
Quad 2-Input AND Gate	ACT08	/883		
Quad 2-Input Exclusive OR Gate	ACT86	/883		
Dual 4-Input NAND Gate	ACT20	/883		
Quad 2-Input NAND Gate	ACT00	/883		
Quad 2-Input NOR Gate	ACT02	/883		
Quad 2-Input OR Gate	ACT32	/883		

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
LATCHES				
Octal Transparent Latch, Three-State	ACT373	/883		
Octal Transparent Latch, Three-State, Inverting	ACT533	/883		
Octal Transparent Latch, Three-State	ACT573	/883		
MULTIPLEXERS				
Dual 4-Input MUX	ACT151	/883		
Dual 4-Input MUX, Three-State	ACT253	/883		
Quad 2-Input MUX	ACT153	/883		
Quad 2-Input MUX, Three-State, Non-Inverting	ACT257	/883		
REGISTERS				
8-Bit Serial In/Parallel Out Shift Register	ACT164	/883		
8-Bit Shift/Storage Register 3-State, Async. Reset	ACT299	/883		
8-Bit Shift/Storage Register 3-State, Sync. Reset	ACT323	/883		
SPECIAL FUNCTION				
4-Bit Full Adder with Fast Carry	ACT283	/883		
9-Bit Odd/Even Parity Generator Checker	ACT280	/883		
Octal Buffer/Line Driver, Three-State	ACT241	/883		
Octal Buffer/Line Driver, Three-State	ACT244	/883		
Octal Buffer/Line Driver, Three-State	ACT541	/883		
Octal Buffer/Line Driver, Three-State Inverting	ACT240	/883		
Octal Buffer/Line Driver, Three-State Inverting	ACT540	/883		
Octal Bus Transceiver, Three-State	ACT245	/883		
Octal Bus Transceiver, Three-State	ACT623	/883		
LOGIC, HC (High Speed CMOS)				
BUFFERS/INVERTERS				
Quad Three-State Buffer	HC125	/883		SMD
Quad Three-State Buffer	HC126	/883		SMD
Hex Buffer/Line Driver, Three-State	HC365	/883		SMD
Hex Buffer/Line Driver, Three-State	HC367	/883		SMD
Hex Buffer/Line Driver, Three-State, Inverting	HC366	/883		SMD
Hex Buffer/Line Driver, Three-State, Inverting	HC368	/883		SMD
Hex Inverter/Buffer	HC04	/883		SMD
Octal Buffer/Line Driver Three-State	HC540	/883		
Octal Buffer/Line Driver, Three-State	HC541	/883		
COUNTERS				
Counter, Synchronous, Presettable 4-Bit Binary	HC161	/883		SMD
Counter, Synchronous, Presettable 4-Bit Binary	HC163	/883		SMD
Decade Counter, Synchronous BCD	HC160	/883		SMD
Decade Counter, Synchronous BCD	HC162	/883		SMD
Down Counter, 8-Bit Binary	HC40103	/883		SMD
Johnson Decade Counter, with 10 Outputs	HC4017	/883		SMD
Ripple Counter, 7-Stage Binary	HC4024	/883		SMD
Ripple Counter, 12-Stage Binary	HC4040	/883		SMD
Ripple Counter, 14-Stage Binary	HC4020	/883		SMD

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
Ripple Counter, 14-Stage Binary	HC4060	/883		SMD
Ripple Counter, Dual, 4-Bit Binary	HC393	/883		SMD
Up-Counter, Dual	HC4520	/883		SMD
Up/Down Binary Counter	HC4516	/883		
Up/Down Counter, Presettable Synchronous BCD	HC190	/883		SMD
Up/Down Counter, Synchronous 4-Bit Binary	HC191	/883		SMD
Up/Down Counter, Synchronous 4-Bit Binary	HC193	/883		SMD
Up/Down Counter, Synchronous BCD	HC192	/883		SMD
DECODERS/ENCODERS				
3-to-8 Line Decoder/DeMUX	HC238	/883		SMD
3-to-8 Line Decoder/DeMUX, Inverting	HC138	/883		SMD
4-to-16 Line Decoder	HC154	/883		SMD
4-to-16 Line Decoder with Input Latch	HC4515	/883		
4-to-16 Line Decoder/DeMUX with Input Latch	HC4514	/883		
10-to-4 Line Priority Encoder	HC147	/883		SMD
BCD-To-7 Segment Latch/Decoder/Driver	HC4511	/883		SMD
Dual 2-of-4 Line Decoder/DeMux	HC139	/883		SMD
FLIP-FLOPS				
Dual D-Type Flip-Flop with Set and Reset	HC74	/883		SMD
Quad D-Type Flip-Flop, Three-State	HC173	/883		SMD
Quad D-Type Flip-Flop, with Reset	HC175	/883		SMD
Octal D-Type Flip-Flop with Reset	HC273	/883		SMD
Octal D-Type Flip-Flop, Three-State	HC374	/883		SMD
Octal D-Type Flip-Flop, Three-State	HC534	/883		SMD
Octal D-Type Flip-Flop, Three-State,	HC564	/883		SMD
Octal D-Type Flip-Flop with Data Enable	HC377	/883		SMD
Octal D Flip-Flop, Three-State	HC574	/883		
Dual J-K Flip-Flop with Reset	HC107	/883		SMD
Dual J-K Flip-Flop with Reset	HC73	/883		SMD
Dual J-K Flip-Flop with Set Reset	HC109	/883		SMD
GATES				
Dual 4-Input AND Gate	HC21	/883		SMD
Triple 3-Input AND Gate	HC11	/883		SMD
Quad 2-Input AND Gate	HC08	/883		SMD
8-Input NAND Gate	HC30	/883		SMD
Triple 3-Input NAND Gate	HC10	/883		SMD
Quad 2-Input NAND Gate	HC00	/883		SMD
Quad 2-Input NAND Gate, Open Collector	HC03	/883		SMD
Quad 2-Input NAND Schmitt Trigger	HC132	/883		
Triple 3-Input NOR Gate	HC27	/883		SMD
Quad 2-Input NOR Gate	HC02	/883		SMD
Quad Exclusive NOR	HC7266	/883		SMD
Quad 2-Input OR Gate	HC32	/883		SMD
Quad 2-Input Exclusive OR Gate	HC86	/883		SMD

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
LATCHES				
8-Bit Addressable Latch	HC259	/883		SMD
Quad Bistable Transparent Latch	HC75	/883		SMD
Octal Transparent Latch, Three-State	HC373	/883		SMD
Octal Transparent Latch, Three-State	HC533	/883		SMD
Octal Transparent Latch, Three-State	HC563	/883		SMD
Octal Transparent Latch, Three-State	HC573	/883		SMD
LEVEL SHIFTERS				
Hex Inverting High-to-Low Level Shift	HC4049	/883		SMD
Hex High-to-Low Level Shifter	HC4050	/883		SMD
MULTIPLEXERS				
8-Channel Analog MUX with Latch	HC4351	/883		
8-Channel Analog MUX/DeMUX	HC4051	/883		
8-Input MUX, Clock-Latched-Data, Three-State	HC356	/883		
8-Input MUX, Latched-Data, Three-State	HC354	/883		
8-Input MUX, Three-State	HC251	/883		SMD
Dual 4-Channel Analog MUX/DeMUX	HC4052	/883		SMD
Dual 4-Input Multiplexer	HC153	/883		SMD
Dual 4-Input MUX, Three-State	HC253	/883		
Triple 2-Channel Analog MUX/DeMUX	HC4053	/883		SMD
Quad 2-Input MUX	HC157	/883		SMD
Quad 2-Input MUX, Inverting	HC158	/883		SMD
Quad 2-Input MUX, Three-State	HC257	/883		SMD
REGISTERS				
4-Bit Bidirectional Universal Shift Register	HC194	/883		SMD
4-Bit Binary 16 Word FIFO Register	HC40105	/883		
4 x 4 Register File, Three-State	HC670	/883		
8-Bit Parallel In/Serial Out Shift Register	HC165	/883		SMD
8-Bit Parallel In/Serial Out Shift Register, with Reset	HC166	/883		
8-Bit Serial In/Parallel Out Shift Register	HC164	/883		SMD
8-Bit Shift Register, with Input Latch	HC597	/883		SMD
8-Bit Universal Shift Register, Three-State	HC299	/883		SMD
8-Stage Shift-and-Store Bus Register	HC4094	/883		
Dual 4-Stage Static Shift Register	HC4015	/883		SMD
SWITCHES				
Quad Bilateral Switch	HC4066	/883		
Quad Analog Switch, with Logic Level Translation	HC4316	/883		
SPECIAL FUNCTION				
4-Bit Binary Full Adder with Fast Carry	HC283	/883		SMD
4-Bit Magnitude Comparator	HC85	/883		SMD
8-Bit Magnitude Comparator	HC688	/883		SMD
9-Bit Odd/Even Parity Generator Checker	HC280	/883		SMD
Dual Monostable Multivibrator with Reset	HC221	/883		SMD
Dual Retriggerable Monostable Multivibrator	HC123	/883		SMD

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
Dual Retriggerable Precision Monostable Multivibrator	HC4538	/883		SMD
Hex Inverting Schmitt Trigger	HC14	/883		SMD
Quad Bus Transceiver, Three-State	HC243	/883		SMD
Octal Buffer/Line Driver Three-State	HC240	/883		SMD
Octal Buffer/Line Driver, Three-State	HC244	/883		SMD
Octal Bus Transceiver, Three-State	HC245	/883		SMD
Octal Bus Transceiver, Three-State Inverting	HC640	/883		SMD
Octal Bus Transceiver/Register, Three-State	HC646	/883		SMD
Phase-Locked Loop with VCO	HC4046A	/883		SMD
LOGIC, HC (High Speed CMOS with TTL Inputs)				
BUFFERS/INVERTERS				
Quad Three-State Buffer	HCT125	/883		
Quad Three-State Buffer	HCT126	/883		SMD
Hex Buffer/Line Driver, Three-State	HCT365	/883		
Hex Buffer/Line Driver, Three-State	HCT367	/883		SMD
Hex Inverter/Buffer	HCT04	/883		SMD
Octal Buffer/Line Driver, Three-State	HCT541	/883		
COUNTERS				
4-Bit Counter, Synchronous Presettable	HCT163	/883		
4-Bit Counter, Synchronous, Presettable	HCT161	/883		SMD
Decade Counter, Synchronous BCD	HCT160	/883		SMD
Decade Counter, Synchronous BCD	HCT162	/883		SMD
Johnson Decade Counter, with 10 Outputs	HCT4017	/883		SMD
Programmable Divided-by-N Counter	HCT4059	/883		SMD
Ripple Counter, 7-Stage Binary	HCT4024	/883		
Ripple Counter, 12-Stage Binary	HCT4040	/883		SMD
Ripple Counter, 14-Stage Binary	HCT4020	/883		SMD
Ripple Counter, 14-Stage Binary	HCT4060	/883		SMD
Ripple Counter, Dual 4-Bit Binary	HCT393	/883		SMD
Ripple Counter, Dual Decade	HCT390	/883		SMD
Up-Counter, Dual	HCT4520	/883		
Up/Down Counter, Synchronous 4-Bit Binary	HCT193	/883		SMD
Up/Down Counter, Synchronous, 4-Bit Binary	HCT191	/883		SMD
DECODERS/ENCODERS				
3-to-8 Line Decoder/DeMUX	HCT238	/883		SMD
3-to-8 Line Decoder/DeMUX, Inverting	HCT138	/883		SMD
4-to-16 Line Decoder	HCT154	/883		SMD
4-to-16 Line Decoder with Input Latch	HCT4515	/883		
4-to-16 Line Decoder/DeMUX with Input Latch	HCT4514	/883		
Dual 2-of-4 Line Decoder/DeMux	HCT139	/883		
FLIP-FLOPS				
Dual D-Type Flip-Flop with Set and Reset	HCT74	/883		SMD
Quad D-Type Flip-Flop, Three-State	HCT173	/883		SMD

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DESCRIPTION	BASE PART #	SCREENING LEVEL		
Quad D-Type Flip-Flop, with Reset	HCT175	/883		SMD
Hex D-Type Flip-Flop, Three-State	HCT174	/883		SMD
Octal D-Type Flip-Flop with Reset	HCT273	/883		SMD
Octal D-Type Flip-Flop, Three-State	HCT374	/883		SMD
Octal D-Type Flip-Flop, Three-State	HCT534	/883		SMD
Octal D-Type Flip-Flop, Three-State,	HCT564	/883		
Octal D-Type Flip-Flop. with Data Enable	HCT377	/883		SMD
Octal D-Type Flip-Flop, Three-State	HCT574	/883		SMD
Dual J-K Flip-Flop with Reset	HCT107	/883		SMD
Dual J-K Flip-Flop with Set Reset	HCT109	/883		SMD
GATES				
Dual 4-Input AND Gate	HCT21	/883		
Triple 3-Input AND Gate	HCT11	/883		SMD
Quad 2-Input AND Gate	HCT08	/883		SMD
8-Input NAND Gate	HCT30	/883		SMD
Dual 4-Input NAND Gate	HCT20	/883		
Triple 3-Input NAND Gate	HCT10	/883		SMD
Quad 2-Input NAND Gate	HCT00	/883		SMD
Quad 2-Input NAND Gate, Open Collector	HCT03	/883		
Quad 2-Input NAND Schmitt Trigger	HCT132	/883		SMD
Triple 3-Input NOR Gate	HCT27	/883		SMD
Quad 2-Input NOR Gate	HCT02	/883		SMD
Triple 3-Input OR Gate	HCT4075	/883		
Quad 2-Input OR Gate	HCT32	/883		SMD
Quad 2-Input Exclusive OR Gate	HCT86	/883		SMD
LATCHES				
8-Bit Addressable Latch	HCT259	/883		SMD
Quad Bistable Transparent Latch	HCT75	/883		SMD
Octal Transparent Latch, Three-State	HCT373	/883		SMD
Octal Transparent Latch, Three-State	HCT533	/883		
Octal Transparent Latch, Three-State	HCT573	/883		SMD
MULTIPLEXERS				
8-Channel Analog MUX/DeMUX	HCT4051	/883		SMD
8-Input MUX	HCT151	/883		SMD
8-Input MUX, Three-State	HCT251	/883		SMD
Dual 4-Input Multiplexer	HCT153	/883		SMD
Triple 2-Channel Analog MUX/DeMUX	HCT4053	/883		
Quad 2-Input MUX	HCT157	/883		SMD
Quad 2-Input MUX, Inverting	fHCT158	/883		SMD
Quad 2-Input MUX, Three-State	HCT257	/883		SMD
Quad 2-Line-to-4-Line Data Selector	HCT258	/883		SMD
REGISTERS				
4-Bit Binary 16 Word FIFO Register	HCT40105	/883		
4 x 4 Register File, Three-State	HCT670	/883		

N = Non-Compliant, /883 = QML Class Q, JAN = Slash Sheets, SMD = Standard Military Drawing, MIL-S-19500 = JAN Slash Sheets

DESCRIPTION	BASE PART #	SCREENING LEVEL		
8-Bit Parallel In/Serial Out Shift Register	HCT165	/883		SMD
8-Bit Parallel In/Serial Out Shift Register, with Reset	HCT166	/883		
8-Bit Serial In/Parallel Out Shift Register	HCT164	/883		SMD
8-Bit Shift Register, with Input Latch	HCT597	/883		
8-Bit Universal Shift Register, Three-State	HCT299	/883		SMD
SPECIAL FUNCTION				
4-Bit Binary Full Adder with Fast Carry	HCT283	/883		
4-Bit Magnitude Comparator	HCT85	/883		SMD
8-Bit Magnitude Comparator	HCT688	/883		SMD
9-Bit Odd/Even Parity Generator Checker	HCT280	/883		
Dual Retriggerable Monostable Multivibrator	HCT123	/883		SMD
Dual Retriggerable Precision Monostable Multivibrator	HCT4538	/883		
Hex Inverting Schmitt Trigger	HCT14	/883		SMD
Octal Buffer/Line Driver, Three-State	HCT241	/883		
Octal Buffer/Line Driver, Three-State	HCT240	/883		SMD
Octal Buffer/Line Driver, Three-State	HCT244	/883		SMD
Quad Bus Transceiver, Three-State	HCT243	/883		
Octal Bus Transceiver, Three-State	HCT245	/883		SMD
Octal Bus Transceiver, Three-State Inverting	HCT640	/883		SMD
Octal Bus Transceiver/Register, Three-State	HCT646	/883		
Phase-Locked Loop with VCO	HCT4046A	/883		SMD

N = Non-Compliant, /883 = QML Class Q, JAN = Slash Sheets, SMD = Standard Military Drawing, MIL-S-19500 = JAN Slash Sheets

TRANSIENT PROTECTION (MOVs)

HIGH-RELIABILITY SERIES MECHANICAL AND ENVIRONMENTAL TESTING FOR AEROSPACE, MILITARY, AND HIGH-RELIABILITY APPLICATIONS

The high-reliability Harris varistor is the latest step in increased product performance and is available for applications requiring assurance levels consistent with military or other standards (MIL-STD-19500, MIL-S-750, Method 202).

This series of high-reliability varistors consists of four categories:

1. DESC Qualified Parts List (QPL) MIL-R-83530. 4 types presently available.
1. DESC Source Control Drawings based on MIL-R-83530. 63 types presently available - ZA Radial Series and DB Industrial Series.
2. Harris high-reliability series offers TX equivalents. 29 types presently available.
3. Custom types processed to customer-specific requirements - (SCD) or to standard military flow.

All MOVs are inherently resistant to radiation: Electron, Neutron, Gamma.

Credentials

Harris varistors and quality management systems are:

- DESC Approved
- QPL Listed
- CECC Approved
- ISO Approved
- UL Approved
- CSA Approved

DESC Qualified Parts List (QPL) MIL-R-83530

MIL-R-83530/1

PART NUMBER M83530/	NOMINAL VARISTOR VOLTAGE (V)	TOLERANCE (%)	VOLTAGE RATING (V)		ENERGY RATING (J)	CLAMPING VOLTAGE AT 100A (V)	CAPACITANCE AT 1MHz (pF)	CLAMPING VOLTAGE AT PEAK CURRENT RATING (V)	I_{TM} (A)	NEAREST COMMERCIAL EQUIVALENT
			(RMS)	(DC)						
1-2000B	200	±10	130	175	50	325	3800	570	6000	V130LA20B
1-2200D	220	+10, -5	150	200	55	360	3200	650	6000	V150LA20B
1-4300E	430	+5, -10	275	369	100	680	1800	1200	6000	V275LA40B
1-5100E	510	+5, -10	320	420	120	810	1500	1450	6000	V320LA40B

This series of varistors are screened and conditioned in accordance with MIL-R-83530 as outlined in the table below. Manufacturing system conforms to MIL-I-45208; MIL-Q-9858.

MIL-R-83530 GROUP A, B, AND C INSPECTIONS

INSPECTION		AQL (PERCENT DEFECTIVE)	MAJOR	MINOR	NUMBER OF SAMPLE UNITS	FAILURES ALLOWED
Group A	SUBGROUP 1					
	High Temperature Life (Stabilization Bake)	100%	-	-	-	-
	Thermal Shock	100%	-	-	-	-
	Power Burn-In	100%	-	-	-	-
	Clamping Voltage	100%	-	-	-	-
	Nominal Varistor Voltage	100%	-	-	-	-
	SUBGROUP 2					
	Visual and Mechanical Examination	-	1.0% AQL 7.6% LQ	25% AQL 13.0% LQ	Per Plan	-
	Body Dimensions	-			Per Plan	-
	Diameter and Length of Leads	-			Per Plan	-
	Marking	-			Per Plan	-
	Workmanship	-			Per Plan	-
	SUBGROUP 3					
	Solderability	-	-	-	Per Plan	-
Group B	SUBGROUP 1					
	Dielectric Withstanding Voltage	-	-	-	Per Plan	-
	SUBGROUP 2					
	Resistance to Solvents	-	-	-	Per Plan	-
	SUBGROUP 3					
	Terminal Strength (Lead Fatigue)	-	-	-	Per Plan	-
	Moisture Resistance	-	-	-	Per Plan	-
	Peak Current	-	-	-	Per Plan	-
	Energy	-	-	-	Per Plan	-

MIL-R-83530 GROUP A, B, AND C INSPECTIONS (Continued)

INSPECTION		AQL (PERCENT DEFECTIVE)	MAJOR	MINOR	NUMBER OF SAMPLE UNITS	FAILURES ALLOWED
Group C	EVERY 3 MONTHS					
	High Temperature Storage	-	-	-	10	0
	Operating Life (Steady State)	-	-	-	10	0
	Pulse Life	-	-	-	10	0
	Shock	-	-	-	10	0
	Vibration	-	-	-	10	0
	Constant Acceleration	-	-	-	10	0
	Energy	-	-	-	10	0

DESC Source Controlled Drawing # 87063

MIL-R-83530 ZA SERIES

87063 DASH NO.	NEAREST COMM. NO.	(NOTE 1) SIZE	MAXIMUM RATINGS (85°C)				CHARACTERISTICS (25°C)					
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE at 1mA DC TEST CURRENT			MAXIMUM CLAMPING VOLTAGE V_C at TEST CURRENT (8/20μs)		TYPICAL CAPACITANCE
			RMS	DC	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)	MIN	$V_{N(DC)}$	MAX	V_C	I_C	f = 1MHz
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}						
			(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(A)	(pF)
001	V22ZA05	1	14	18	0.2	35	18.7	22	26	51	2	400
002	V22ZA1	2	14	18	0.9	150	18.7	22	26	47	5	1600
003	V22ZA2	3	14	18	2.0	350	18.7	22	26	43	5	4000
004	V22ZA3	4	14	18	4.0	750	18.7	22	26	43	10	9000
005	V24ZA50	5	14	18	6.5	1500	19.2	24 (Note 2)	26	43	20	18000
006	V27ZA05	1	17	22	0.25	35	23	27	31.1	59	2	300
007	V27ZA1	2	17	22	1.0	150	23	27	31.1	57	5	1300
008	V27ZA2	3	17	22	2.5	350	23	27	31.1	53	5	3000
009	V27ZA4	4	17	22	5.0	750	23	27	31.1	53	10	7000
010	V27ZA60	5	17	22	8.0	1500	23	27 (Note 2)	31.1	50	20	15000
011	V33ZA05	1	20	26	0.3	35	29.5	33	38	67	2	250
012	V33ZA1	2	20	26	1.2	150	29.5	33	36.5	68	5	1100
013	V33ZA2	3	20	26	3.0	350	29.5	33	36.5	64	5	2700
014	V33ZA5	4	20	26	6.0	750	29.5	33	36.5	64	10	6000
015	V33ZA70	5	21	27	9.0	1500	29.5	33 (Note 2)	36.5	58	20	13000

MIL-R-83530 ZA SERIES (Continued)

87063 DASH NO.	NEAREST COMM. NO.	(NOTE 1) SIZE	MAXIMUM RATINGS (85°C)				CHARACTERISTICS (25°C)					
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE at 1mA DC TEST CURRENT			MAXIMUM CLAMPING VOLTAGE V_C at TEST CURRENT (8/20μs)		TYPICAL CAPACITANCE
			RMS	DC	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)						
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}	MIN	$V_{N(DC)}$	MAX	V_C	I_C	f = 1MHz
			(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(A)	(pF)
016	V36ZA80	5	23	31	10.0	1500	32	36 (Note 2)	40	63	20	12000
017	V39ZA05	1	25	31	0.35	35	35	39	46	79	2	220
018	V39ZA1	2	25	31	1.5	150	35	39	43	79	5	900
019	V39ZA3	3	25	31	3.5	350	35	39	43	76	5	2200
020	V39ZA6	4	25	31	7.2	750	35	39	43	76	10	5000
021	V47ZA05	1	30	38	0.4	35	42	47	55	90	2	200
022	V47ZA1	2	30	38	1.8	150	42	47	52	92	5	800
023	V47ZA3	3	30	38	4.5	350	42	47	52	89	5	2000
024	V47ZA7	4	30	38	8.8	750	42	47	52	89	10	4500
025	V56ZA05	1	35	45	0.5	35	50	56	66	108	2	180
026	V56ZA2	2	35	45	2.3	150	50	56	62	107	5	700
027	V56ZA3	3	35	45	5.5	350	50	56	62	103	5	1800
028	V56ZA8	4	35	45	10.0	750	50	56	62	103	10	3900
029	V68ZA05	1	40	56	0.6	35	61	68	80	127	2	150
030	V68ZA2	2	40	56	3.0	150	61	68	75	127	5	600
031	V68ZA3	3	40	56	6.5	350	61	68	75	123	5	1500
032	V68ZA10	4	40	56	13.0	750	61	68	75	123	10	3300
033	V82ZA05	1	50	66	1.2	70	73	82	97	145	2	120
034	V82ZA2	2	50	66	3.5	300	73	82	91	135	10	500
035	V82ZA4	3	50	66	7.3	750	73	82	91	135	25	1100
036	V82ZA12	4	50	66	13.0	1500	73	82	91	145	50	2500
037	V100ZA05	1	60	81	1.5	70	90	100	117	175	2	90
038	V100ZA3	2	60	81	4.3	300	90	100	110	165	10	400
039	V100ZA4	3	60	81	8.9	750	90	100	110	165	25	900
040	V100ZA15	4	60	81	16.0	1500	90	100	110	175	50	2000
041	V120ZA05	1	75	102	1.8	100	108	120	138	205	2	70
042	V120ZA1	2	75	102	5.3	400	108	120	132	205	10	300
043	V120ZA4	3	75	102	11.0	1000	108	120	132	200	25	750
044	V120ZA6	4	75	102	19.0	2000	108	120	132	210	50	1700

MIL-R-83530 ZA SERIES (Continued)

87063 DASH NO.	NEAREST COMM. NO.	(NOTE 1) SIZE	MAXIMUM RATINGS (85°C)				CHARACTERISTICS (25°C)					
			CONTINUOUS		TRANSIENT		VARISTOR VOLTAGE at 1mA DC TEST CURRENT			MAXIMUM CLAMPING VOLTAGE V_C at TEST CURRENT (8/20μs)		TYPICAL CAPACITANCE
			RMS	DC	ENERGY (10/1000μs)	PEAK CURRENT (8/20μs)	MIN	$V_{N(DC)}$	MAX	V_C	I_C	f = 1MHz
			$V_{M(AC)}$	$V_{M(DC)}$	W_{TM}	I_{TM}						
			(V)	(V)	(J)	(A)	(V)	(V)	(V)	(V)	(A)	(pF)
045	V150ZA05	1	92	127	2.3	100	135	150	173	240	2	60
046	V150ZA1	2	95	127	6.5	400	135	150	165	250	10	250
047	V150ZA4	3	95	127	13.0	1000	135	150	165	250	25	600
048	V150ZA8	4	95	127	23.0	2000	135	150	165	255	50	1400
049	V180ZA05	1	110	153	2.7	150	162	180	207	290	2	50
050	V180ZA1	2	115	153	7.7	500	162	180	198	295	10	200
051	V180ZA5	3	115	153	16.0	1500	162	180	198	300	25	500
052	V180ZA10	4	115	153	27.0	3000	162	180	198	300	50	1100

NOTES:

1. Size 1-5mm, 2-7mm, 3-10mm, 4-14mm, 5-20mm.
2. Denotes 10mA DC test current.

DESC Standard Military Drawing # 90065

MIL-R-83530 DB SERIES

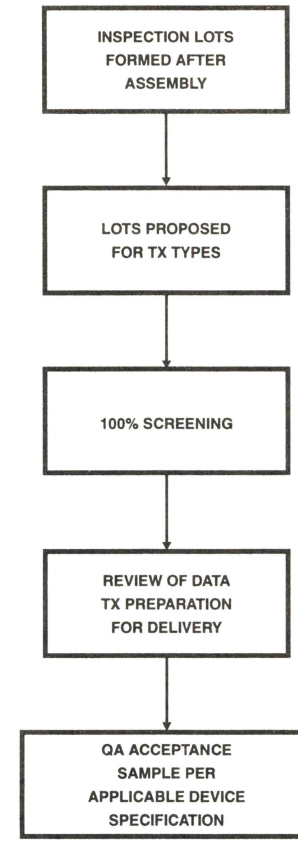
MARKETING PART NUMBER	VOLTAGE RATING MAX (RMS)	ENERGY MAX (J)	PEAK CURRENT (A)	NOMINAL VARISTOR VOLTAGE (V)		MAX CLAMPING VOLTAGE AT TEST CURRENT		TYPICAL CAPACITANCE (pF)
						(V)	(I)	
90065-012	130	170	22500	200	+28, -16	345	200	10000
90065-013	150	200	22500	240	±28	405	200	8000
90065-014	250	270	22500	390	+39, -36	650	200	5000
90065-015	275	300	22500	430	±43	730	200	4500
90065-016	320	350	22500	510	+29, -48	830	200	3800
90065-017	420	460	28800	680	+68, -70	1130	200	3000
90065-018	480	510	28800	750	+74, -80	1240	200	2700
90065-019	510	550	28800	820	+91, -85	1350	200	2500
90065-020	575	600	28800	910	+95, -105	1480	200	2200
90065-021	660	690	28800	1050	±110	1720	200	2000
90065-022	750	810	28800	1200	±120	2000	200	1800

Harris High-Reliability Series TX Equivalents

TX MODEL TYPES

TX MODEL	MODEL SIZE	DEVICE MARK	NEAREST COMMERCIAL EQUIVALENT
V8ZTX1	7mm	8TX1	V8ZA1
V8ZTX2	10mm	8TX2	V8ZA2
V12ZTX1	7mm	12TX1	V12ZA1
V12ZTX2	10mm	12TX2	V12ZA2
V22ZTX1	7mm	22TX1	V22ZA1
V22ZTX3	14mm	22TX3	V22ZA3
V24ZTX50	20mm	24TX50	V24ZA50
V33ZTX1	7mm	33TX1	V33ZA1
V33ZTX5	14mm	33TX5	V33ZA5
V33ZTX70	20mm	33TX70	V33ZA70
V68ZTX2	7mm	68TX2	V68ZA2
V68ZTX10	14mm	68TX10	V68ZA10
V82ZTX2	7mm	82TX2	V82ZA2
V82ZTX12	14mm	82TX12	V82ZA12
V130LTX2	7mm	130TX	V130LA2
V130LTX10A	14mm	130TX10	V130LA10A
V130LTX20B	20mm	130TX20	V130LA20A
V150LTX2	7mm	150TX	V150LA2
V150LTX10A	14mm	150TX10	V150LA10A
V150LTX20B	20mm	150TX20	V150LA20B
V250LTX4	7mm	250TX	V250LA4
V250LTX20A	14mm	250TX20	V250LA20A
V250LTX40B	20mm	250TX40	V250LA40B
V420LTX20A	14mm	420TX20	V420LA20A
V420LTX40B	20mm	420TX40	V420LA40B
V480LTX40A	14mm	480TX40	V480LA40A
V480LTX80B	20mm	480TX80	V480LA80B
V510LTX40A	14mm	510TX40	V510LA40A
V510LTX80B	20mm	510TX80	V510LA80B

This series of varistors are 100% screened and conditioned in accordance with MIL-STD-750.



CD4000B DC ELECTRICAL SPECIFICATIONS - STANDARD "B" SERIES DEVICES

For all CD4000B Series Standard Output CMOS Devices. Parameters are 100% Tested Unless Otherwise Specified.

PARAMETER		TEST CONDITIONS			-55°C		25°C		125°C		UNITS
		V_O	V_{IN}	V_{DD}	MIN	MAX	MIN	MAX	MIN	MAX	
Functional Test (Notes 1 and 2)		-	-	-	-	-	-	-	-	-	
Quiescent Device Current I_{DD} See Classification Table	SSI Types (Note 3)	-	0, 5	5	-	0.25 (Note 2)	-	0.25 (Note 2)	-	7.5 (Note 2)	µA
		-	0, 10	10	-	0.5 (Note 2)	-	0.5 (Note 2)	-	15 (Note 2)	µA
		-	0, 15	15	-	1 (Note 2)	-	1 (Note 2)	-	30 (Note 2)	µA
		-	0, 20	20	-	5	-	5	-	150	µA
	MSI-1 (Note 3 and Note 4)	-	0, 5	5	-	1 (Note 2)	-	1 (Note 2)	-	30 (Note 2)	µA
		-	0, 10	10	-	2 (Note 2)	-	2 (Note 2)	-	60 (Note 2)	µA
		-	0, 15	15	-	4 (Note 2)	-	4 (Note 2)	-	120 (Note 2)	µA
		-	0, 20	20	-	20	-	20	-	600	µA
	MSI-2 (Note 3)	-	0, 5	5	-	5 (Note 2)	-	5 (Note 2)	-	150 (Note 2)	µA
		-	0, 10	10	-	10 (Note 2)	-	10 (Note 2)	-	300 (Note 2)	µA
		-	0, 15	15	-	20 (Note 2)	-	20 (Note 2)	-	600 (Note 2)	µA
		-	0, 20	20	-	100	-	100	-	3000	µA
Output Low Drive Current, I_{OL} Min		0.4	0, 5	5	0.64 (Note 2)	-	0.51	-	0.36 (Note 2)	-	mA
		0.5	0, 10	10	1.6 (Note 2)	-	1.3	-	0.9 (Note 2)	-	mA
		1.5	0, 15	15	4.2 (Note 2)	-	3.4	-	2.4 (Note 2)	-	mA
Output High Drive Current, I_{OH} Min		4.6	0, 5	5	-0.64	-	-0.51	-	-0.36 (Note 2)	-	mA
		2.5	0, 5	5	-2.0	-	-1.6	-	-1.15 (Note 2)	-	mA
		9.5	0, 10	10	-1.6	-	-1.3	-	-0.9 (Note 2)	-	mA
		13.5	0, 15	15	-4.2	-	-3.4	-	-2.4 (Note 2)	-	mA

CD4000B DC ELECTRICAL SPECIFICATIONS - STANDARD "B" SERIES DEVICES (Continued)

For all CD4000B Series Standard Output CMOS Devices. Parameters are 100% Tested Unless Otherwise Specified.

PARAMETER		TEST CONDITIONS			-55°C		25°C		125°C		UNITS
		V_O	V_{IN}	V_{DD}	MIN	MAX	MIN	MAX	MIN	MAX	
Output Voltage Low-Level, V_{OL} Max		-	0, 5	5	-	0.05 (Note 2)	-	0.05 (Note 2)	-	0.05 (Note 2)	V
		-	0, 10	10	-	0.05 (Note 2)	-	0.05 (Note 2)	-	0.05 (Note 2)	V
		-	0, 15	15	-	0.05	-	0.05	-	0.05	V
Output Voltage High-Level, V_{OH} Min		-	0, 5	5	4.95 (Note 2)	-	4.95 (Note 2)	-	4.95	-	V
		-	0, 10	10	9.95 (Note 2)	-	9.95 (Note 2)	-	9.95	-	V
		-	0, 15	15	14.95	-	14.95	-	14.95	-	V
Input Low Voltage V_{IL} Max	Buffered (B)	4.5	-	5	-	1.5	-	1.5	-	1.5	V
		9	-	10	-	3 (Note 2)	-	3	-	3	V
		13.5	-	15	-	4	-	4	-	4	V
	Unbuffered (UB)	4.5	-	5	-	1 (Note 2)	-	1	-	1	V
		9	-	10	-	2	-	2	-	2	V
		13.5	-	15		2.5		2.5		2.5	V
Input High Voltage V_{IH} Min	Buffered (B)	0.5, 4.5	-	5	3.5	-	3.5	-	3.5	-	V
		1, 9	-	10	7	-	7	-	7	-	V
		1.5, 13.5	-	15	11	-	11	-	11	-	V
	Unbuffered (UB)	0.5, 4.5	-	5	4	-	4	-	4	-	V
		1, 9	-	10	8	-	8	-	8	-	V
		1.5, 13.5	-	15	12.5	-	12.5	-	12.5	-	V
Input Current, I_{IN} (Note 3)		-	0, 20	20	-	±0.1	-	±0.1	-	±1	µA
Three-State Output Leakage Current, I_{OUT} (Notes 3 and 5)		0, 20	0, 20	20	-	±0.4	-	±0.4	-	±12	µA

NOTES:

1. At 25°C V_{IN} = 0 - 20V, V_{DD} = 20V; 125°C V_{IN} = 0 -18V, V_{DD} = 18V; and at -55°C V_{IN} = 0 - 3V, V_{DD} = 3V.
2. These parameters are controlled via design or process parameters and are not directly tested. These parameters are characterized upon initial design release and upon design changes which would affect these characteristics.
3. At -55°C, test is performed with V_{DD} of 18V.
4. CD4047B - Maximum DC supply voltage V_{DD} is 13V for radiation hardened version of this type when operating with RC network.
5. For applicable devices only.

CD4000B NON-STANDARD DC ELECTRICAL SPECIFICATIONS "B" SERIES DEVICES

PARAMETER	TEST CONDITIONS			-55°C	25°C		125°C	UNITS
	V_O	V_{IN}	V_{DD}	MIN/ MAX	MIN	MAX	MIN/ MAX	
CD4009UB, CD4010B								
Output Low Drive Current, I_{OL} Min (Note 2)	0.4	0, 5	4.5	3.2	2.6	-	1.8	mA
	0.4	0, 5	5	3.75	3 (Note 1)	-	2.1	mA
	0.5	0, 10	10	10.0	8 (Note 1)	-	5.6	mA
	1.5	0, 15	15	30.0	24 (Note 1)	-	16.0	mA
Output High Drive Current, I_{OH} Min (Note 2)	4.6	0, 5	5	-0.25	-0.2 (Note 1)	-	-0.15	mA
	2.5	0, 5	5	-1.0	-0.8 (Note 1)	-	-0.58	mA
	9.5	0, 10	10	-0.55	-0.45 (Note 1)	-	-0.33	mA
	13.5	0, 15	15	-1.65	-1.5 (Note 1)	-	-1.1	mA
CD4016B								
Control Input Voltage Low, V_{IL} Max (Note 2)	$V_{IS} = V_{SS}$, $V_{OS} = V_{DD}$ $V_{IS} = V_{DD}$, $V_{OS} = V_{SS}$ $\|I_{IS}\| < 10\mu A$		5	0.9 (Note 1)	-	0.7 (Note 1)	0.4 (Note 1)	V
			10	0.9	-	0.7	0.4	V
			15	0.9 (Note 1)	-	0.7 (Note 1)	0.4 (Note 1)	V
Control Input Voltage High, V_{IH} Min (Note 2)	-		5	3.5 (Note 1)	3.5 (Note 1)	-	3.5 (Note 1)	V
			10	7.0	7.0	-	7.0	V
			15	11.0 (Note 1)	11.0 (Note 1)	-	11.0 (Note 1)	V
On-State Resistance, R_{ON} Max R_L = 10K Returned to $V_{DD} - V_{SS}/2$ (Note 2)	$V_{IS} = V_{DD}$ or V_{SS} V_{IS} = 4.75 or 5.75		10	600 (Note 1)	-	660 (Note 1)	960 (Note 1)	Ω
	$V_{IS} = V_{DD}$ or V_{SS} V_{IS} = 7.25 or 7.75		10	1870 (Note 1)	-	2000 (Note 1)	2600 (Note 1)	Ω
			15	360 (Note 1)	-	400 (Note 1)	600 (Note 1)	Ω
			15	775 (Note 1)	-	850 (Note 1)	1230 (Note 1)	Ω
CD4031B								
Output Low Drive Current, I_{OL} Min Q (Note 2)	0.4	0, 5	5	2.56	2.04 (Note 1)	-	1.44	mA
	0.5	0, 10	10	6.4	5.2 (Note 1)	-	3.6	mA
	1.5	0, 15	15	16.8	13.6 (Note 1)	-	9.6	mA
$\overline{Q}$, Q´, C_{LD} (Note 2)	0.4	0, 5	5	0.64	0.51 (Note 1)	-	0.36	mA
	0.5	0, 10	10	1.6	1.3 (Note 1)	-	0.9	mA
	1.5	0, 15	15	4.2	3.4 (Note 1)	-	2.4	mA

CD4000B NON-STANDARD DC ELECTRICAL SPECIFICATIONS "B" SERIES DEVICES (Continued)

PARAMETER	TEST CONDITIONS			-55°C	25°C		125°C	UNITS
	V_O	V_{IN}	V_{DD}	MIN/ MAX	MIN	MAX	MIN/ MAX	
Output High Drive Current, I_{OH} Min Q, $\overline{Q}$, Q', C_{LD} (Note 2)	4.6	0, 5	5	-0.64	-0.51 (Note 1)	-	-0.36	mA
	2.5	0, 5	5	-2.0	-1.6 (Note 1)	-	-1.15	mA
	9.5	0, 10	10	-1.6	-1.3 (Note 1)	-	-0.9	mA
	13.5	0, 15	15	-4.2	-3.4 (Note 1)	-	-2.4	mA
CD4041UB								
Output Low Drive Current, I_{OL} Min (Note 2)	0.4	0, 5	5	2.1	1.6 (Note 1)	-	1.2	mA
	0.5	0, 10	10	6.25	5 (Note 1)	-	3.5	mA
	1.5	0, 15	15	24	19 (Note 1)	-	13	mA
Output High Drive Current, I_{OH} Min (Note 2)	4.6	0, 5	5	-2.1	-1.6 (Note 1)	-	-1.2	mA
	2.5	0, 5	5	-8.4	-6.4 (Note 1)	-	-4.6	mA
	9.5	0, 10	10	-6.25	-5 (Note 1)	-	-3.5	mA
	13.5	0, 15	15	-24	-19 (Note 1)	-	-13	mA
CD4046B								
Zener Diode Voltage, V_Z (Note 3)	$I_Z = 50\mu A$			-	4.45 (Note 1)	6.5 (Note 1)	-	V
Quiescent Leakage, Phase Comparator Pin 14 Open, Pin 5 = V_{DD} (Note 3)	-	0, 5	5	0.2	-	0.2	-	mA
	-	0, 10	10	1.0	-	1.0	-	mA
	-	0, 15	15	1.5	-	1.5	-	mA
	-	0, 20	20	4.0 (Note 1)	-	4.0 (Note 1)	-	mA
Quiescent Leakage, Phase Comparator Pin 14 = V_{SS} or V_{DD}, Pin 5 = V_{DD} (Note 3)	-	0, 5	5	20	-	20	-	µA
	-	0, 10	10	40	-	40	-	µA
	-	0, 15	15	80	-	80	-	µA
	-	0, 20	20	160 (Note 1)	-	160 (Note 1)	-	µA
CD4049UB, CD4050B								
Output Low Drive Current, I_{OL} Min (Note 2)	0.4	0, 5	4.5	3.3	2.6 (Note 1)	-	1.8	mA
	0.4	0, 5	5	4.0	3.2 (Note 1)	-	2.4	mA
	0.5	0, 10	10	10	8.0 (Note 1)	-	5.6	mA
	1.5	0, 15	15	26	24 (Note 1)	-	18	mA

CD4000B NON-STANDARD DC ELECTRICAL SPECIFICATIONS "B" SERIES DEVICES (Continued)

PARAMETER	TEST CONDITIONS			-55°C	25°C		125°C	UNITS
	V_O	V_{IN}	V_{DD}	MIN/ MAX	MIN	MAX	MIN/ MAX	
Output High Drive Current, I_{OH} Min (Note 2)	4.6	0, 5	5	-0.81	-0.8 (Note 1)	-	-0.48	mA
	2.5	0, 5	5	-2.6	-3.2 (Note 1)	-	-1.55	mA
	9.5	0, 10	10	-2.0	-1.8 (Note 1)	-	-1.18	mA
	13.5	0, 15	15	-5.2	-6.0 (Note 1)	-	-3.1	mA
CD4051B, CD4052B, CD4053B, CD4067B, CD4097B								
On-State Resistance, R_{ON} Max (Note 3)	R_L = 10K Returned to V_{DD} - V_{SS}/2 V_{IS} = V_{SS} to V_{DD}		5	800 (Note 1)	-	1050 (Note 1)	1300 (Note 1)	Ω
			10	310 (Note 1)	-	400 (Note 1)	500 (Note 1)	Ω
			15	200 (Note 1)	-	240 (Note 1)	320 (Note 1)	Ω
Input Voltage Low, V_{IL} Max (Note 2)	V_{EE} = V_{SS} R_L = 1K to V_{SS} $\|I_{IS}\|$ <2μA		5	1.5 (Note 1)	-	1.5 (Note 1)	1.5 (Note 1)	V
			10	3.0	-	3.0	3.0	V
			15	4.0 (Note 1)	-	4.0 (Note 1)	4.0 (Note 1)	V
Input Voltage High, V_{IH} Min (Note 2)	V_{EE} = V_{SS} R_L = 1K to V_{SS} $\|I_{IS}\|$ <2μA		5	3.5 (Note 1)	3.5 (Note 1)	-	3.5 (Note 1)	V
			10	7.0	7.0	-	7.0	V
			15	11.0 (Note 1)	11.0 (Note 1)	-	11.0 (Note 1)	V
Off Channel Leakage Current Any Channel Off Max (Note 3)	V_{SS} = 0	V_{EE} = 0	18	±100 (Note 1)	-	±100 (Note 1)	±1000 (Note 1)	nA
Off Channel Leakage Current All Channels (Common Out/In) Off Max (Note 3)	V_{SS} = 0	V_{EE} = 0	18	±100 (Note 1)	-	±100 (Note 1)	±1000 (Note 1)	nA
CD4054B, CD4056B								
	V_{EE}	V_{SS}						
Output Low (Sink) Current, I_{OL} (Note 2)	-5	0	-4.5	-	5	0.98	0.8 (Note 1)	-	0.55	mA
	0	0	0.5	-	10	0.98	0.8 (Note 1)	-	0.55	mA
	0	0	1.5	-	15	3.6	2.9 (Note 1)	-	2	mA
Output High (Source) Current, I_{OH} (Note 2)	-5	0	4.5	-	5	-0.6	-0.45 (Note 1)	-	-0.3	mA
	0	0	9.5	-	10	-0.6	-0.45 (Note 1)	-	-0.3	mA
	0	0	13.5	-	15	-1.9	-1.5 (Note 1)	-	-1.1	mA

CD4000B NON-STANDARD DC ELECTRICAL SPECIFICATIONS "B" SERIES DEVICES (Continued)

PARAMETER	TEST CONDITIONS			-55°C	25°C		125°C	UNITS
	V_O	V_{IN}	V_{DD}	MIN/ MAX	MIN	MAX	MIN/ MAX	
CD4066B								
On-State Resistance, R_{ON} Max (Note 3)	R_L = 10K Returned to V_{DD} - V_{SS}/2 V_{IS} = V_{SS} to V_{DD}		5	800 (Note 1)	-	1050 (Note 1)	1300 (Note 1)	Ω
			10	310 (Note 1)	-	400 (Note 1)	550 (Note 1)	Ω
			15	200 (Note 1)	-	240 (Note 1)	320 (Note 1)	Ω
Control Input Voltage Low, V_{ILC} Max (Note 2)	V_{IS} = V_{SS}, V_{OS} = V_{DD}, V_{IS} = V_{DD}, V_{OS} = V_{SS} $\|I_{IS}\|$ <10μA		5	1.0 (Note 1)	-	1.0 (Note 1)	1.0 (Note 1)	V
			10	2.0	-	2.0	2.0	V
			15	2.0 (Note 1)	-	2.0 (Note 1)	2.0 (Note 1)	V
Control Input Voltage High, V_{IHC} Min (Note 2)	-		5	3.5 (Note 1)	3.5 (Note 1)	-	3.5 (Note 1)	V
			10	7.0	7.0	-	7.0	V
			15	11.0 (Note 1)	11.0 (Note 1)	-	11.0 (Note 1)	V
Input/Output Leakage Current (Switch Off) Effective Off Resistance V_C = V_{SS} (Note 3)	0	0	18	±100	-	±100	±1000	nA
CD4093B								
Positive Trigger Threshold Voltage (Note 3) V_P Min	-	(Note 4)	5	2.2 (Note 1)	2.2 (Note 1)	-	2.2 (Note 1)	V
	-	(Note 4)	10	4.6	4.6	-	4.6	V
	-	(Note 4)	15	6.8 (Note 1)	6.8 (Note 1)	-	6.8 (Note 1)	V
	-	(Note 5)	5	2.6 (Note 1)	2.6 (Note 1)	-	2.6 (Note 1)	V
	-	(Note 5)	10	5.6	5.6	-	5.6	V
	-	(Note 5)	15	6.3	6.3	-	6.3	V
V_P Max	-	(Note 4)	5	3.6 (Note 1)	-	3.6 (Note 1)	3.6 (Note 1)	V
	-	(Note 4)	10	7.1	-	7.1	7.1	V
	-	(Note 4)	15	10.8 (Note 1)	-	10.8 (Note 1)	10.8 (Note 1)	V
	-	(Note 5)	5	4 (Note 1)	-	4 (Note 1)	4 (Note 1)	V
	-	(Note 5)	10	8.2	-	8.2	8.2	V
	-	(Note 5)	15	12.7	-	12.7	12.7	V

CD4000B NON-STANDARD DC ELECTRICAL SPECIFICATIONS "B" SERIES DEVICES (Continued)

PARAMETER		TEST CONDITIONS			-55°C	25°C		125°C	UNITS
		V_O	V_{IN}	V_{DD}	MIN/ MAX	MIN	MAX	MIN/ MAX	
Negative Trigger Threshold Voltage (Note 3)	V_N Min	-	(Note 4)	5	0.9 (Note 1)	0.9 (Note 1)	-	0.9 (Note 1)	V
		-	(Note 4)	10	2.5	2.5	-	2.5	V
		-	(Note 4)	15	4 (Note 1)	4 (Note 1)	-	4 (Note 1)	V
		-	(Note 5)	5	1.4 (Note 1)	1.4 (Note 1)	-	1.4 (Note 1)	V
		-	(Note 5)	10	3.4	3.4	-	3.4	V
		-	(Note 5)	15	4.8	4.8	-	4.8	V
	V_N Max	-	(Note 4)	5	2.8 (Note 1)	-	2.8 (Note 1)	2.8 (Note 1)	V
		-	(Note 4)	10	5.2	-	5.2	5.2	V
		-	(Note 4)	15	7.4 (Note 1)	-	7.4 (Note 1)	7.4 (Note 1)	V
		-	(Note 5)	5	3.2 (Note 1)	-	3.2 (Note 1)	3.2 (Note 1)	V
		-	(Note 5)	10	6.6	-	6.6	6.6	V
		-	(Note 5)	15	9.6	-	9.6	9.6	V
Hysteresis Voltage (Note 3)	V_H Min	-	(Note 4)	5	0.3 (Note 1)	0.3 (Note 1)	-	0.3 (Note 1)	V
		-	(Note 4)	10	1.2	1.2	-	1.2	V
		-	(Note 4)	15	1.6 (Note 1)	1.6 (Note 1)	-	1.6 (Note 1)	V
		-	(Note 5)	5	0.3 (Note 1)	0.3 (Note 1)	-	0.3 (Note 1)	V
		-	(Note 5)	10	1.2	1.2	-	1.2	V
		-	(Note 5)	15	1.6	1.6	-	1.6	V
	V_H Max	-	(Note 4)	5	1.6 (Note 1)	-	1.6 (Note 1)	1.6 (Note 1)	V
		-	(Note 4)	10	3.4	-	3.4	3.4	V
		-	(Note 4)	15	5 (Note 1)	-	5 (Note 1)	5 (Note 1)	V
		-	(Note 5)	5	1.6 (Note 1)	-	1.6 (Note 1)	1.6 (Note 1)	V
		-	(Note 5)	10	3.4	-	3.4	3.4	V
		-	(Note 5)	15	5	-	5	5	V
CD4502B									
Output Low Drive Current, I_{OL} Min (Note 2)		0.4	0, 5	5	3.84	3.06 (Note 1)	-	2.16	mA
		0.5	0, 10	10	9.6	7.8 (Note 1)	-	5.4	mA
		1.5	0, 15	15	25.2	20.4 (Note 1)	-	14.4	mA

CD4000B NON-STANDARD DC ELECTRICAL SPECIFICATIONS "B" SERIES DEVICES (Continued)

PARAMETER			TEST CONDITIONS			-55°C	25°C		125°C	UNITS
			V_O	V_{IN}	V_{DD}	MIN/ MAX	MIN	MAX	MIN/ MAX	
CD4503B										
Output Low Drive Current, I_{OL} Min (Note 2)			0.4	0	5	2.6	2.1 (Note 1)	-	1.3	mA
			0.5	0	10	6.5	5.5 (Note 1)	-	3.8	mA
			1.5	0	15	19.2	16.1 (Note 1)	-	11.2	mA
Output High Drive Current, I_{OH} Min (Note 2)			4.6	5	5	-1.2	-1.02 (Note 1)	-	-0.7	mA
			2.5	5	5	-5.8	-4.8 (Note 1)	-	-3.0	mA
			9.5	10	10	-3.1	-2.6 (Note 1)	-	-1.8	mA
			13.5	15	15	-8.2	-6.8 (Note 1)	-	-4.8	mA
CD4504B										
		V_{CC}								
Input Low Voltage V_{IL} Max (Note 2)	TTL-CMOS	5	1	-	10	0.8	-	0.8	0.8	V
	TTL-CMOS	5	1	-	15	0.8 (Note 1)	-	0.8 (Note 1)	0.8 (Note 1)	V
	CMOS-CMOS	5	1	-	10	1.5 (Note 1)	-	1.5 (Note 1)	1.5 (Note 1)	V
	CMOS-CMOS	5	1.5	-	15	1.5	-	1.5	1.5	V
	CMOS-CMOS	10	1.5		15	3 (Note 1)	-	3 (Note 1)	3 (Note 1)	V
Input High Voltage V_{IH} Min (Note 2)	TTL-CMOS	5	9	-	10	2	2	-	2	V
	TTL-CMOS	5	13.5	-	15	2 (Note 1)	2 (Note 1)	-	2 (Note 1)	V
	CMOS-CMOS	5	9	-	10	3.5 (Note 1)	3.5 (Note 1)	-	3.5 (Note 1)	V
	CMOS-CMOS	5	13.5	-	15	3.5	3.5	-	3.5	V
	CMOS-CMOS	10	13.5		15	7 (Note 1)	7 (Note 1)	-	7 (Note 1)	V
CD4511B										
Output Voltage High-Level, V_{OH} Min (Note 3)			-	0, 5	5	4	4.1	-	4.2	V
			-	0, 10	10	9	9.1	-	9.2	V
			-	0, 15	15	14 (Note 1)	14.1 (Note 1)	-	14.2 (Note 1)	V
		I_{OH} (mA)								
Output Drive Voltage High Level, V_{OH} Min (Note 3)		0	-	-	5	4.0	4.1	-	4.2	V
		5	-	-	5	-	-	-	-	V
		10	-	-	5	3.8	3.9	-	3.9	V
		15	-	-	5	-	-	-	3.5	V
		20	-	-	5	3.55	3.4 (Note 1)	-	-	V
		25	-	-	5	3.4	3.1	-	-	V

CD4000B NON-STANDARD DC ELECTRICAL SPECIFICATIONS "B" SERIES DEVICES (Continued)

PARAMETER		TEST CONDITIONS V_O	TEST CONDITIONS V_{IN}	TEST CONDITIONS V_{DD}	-55°C MIN/MAX	25°C MIN	25°C MAX	125°C MIN/MAX	UNITS
Output Drive Voltage High Level, V_{OH} Min (Note 3)	0	-	-	10	9.0	9.1	-	9.2	V
	5	-	-	10	-	-	-	-	V
	10	-	-	10	8.85	9.0	-	9.0	V
	15	-	-	10	-	-	-	-	V
	20	-	-	10	8.7	8.6 (Note 1)	-	8.4	V
	25	-	-	10	8.6	8.3	-	-	V
Output Drive Voltage High Level, V_{OH} Min (Note 3)	0	-	-	15	14.0	14.10	-	14.20	V
	5	-	-	15	-	-	-	-	V
	10	-	-	15	13.90	14.0	-	14.0	V
	15	-	-	15	-	-	-	-	V
	20	-	-	15	13.75	13.70 (Note 1)	-	13.50	V
	25	-	-	15	13.65	13.50	-	-	V
CD4541B									
Output Low Drive Current, I_{OL} Min (Note 2)		0.4	0, 5	5	1.9	1.55 (Note 1)	-	1.08	mA
		0.5	0, 10	10	5.0	4.0 (Note 1)	-	2.8	mA
		1.5	0, 15	15	12.6	10.0 (Note 1)	-	7.2	mA
Output High Drive Current, I_{OH} Min (Note 2)		4.6	0, 5	5	-1.9	-1.55 (Note 1)	-	-1.08	mA
		2.5	0, 5	5	-6.2	-5.0 (Note 1)	-	-3.0	mA
		9.5	0, 10	10	-5.0	-4.0 (Note 1)	-	2.8	mA
		13.5	0, 15	15	-12.6	-10.0 (Note 1)	-	-7.2	mA
CD40106B									
Positive Trigger Threshold Voltage (Note 3)	V_P Min	-	-	5	2.2 (Note 1)	2.2 (Note 1)	-	2.2 (Note 1)	V
		-	-	10	4.6 (Note 1)	4.6 (Note 1)	-	4.6 (Note 1)	V
		-	-	15	6.8 (Note 1)	6.8 (Note 1)	-	6.8 (Note 1)	V
	V_P Max	-	-	5	3.6 (Note 1)	-	3.6 (Note 1)	3.6 (Note 1)	V
		-	-	10	7.1 (Note 1)	-	7.1 (Note 1)	7.1 (Note 1)	V
		-	-	15	10.8 (Note 1)	-	10.8 (Note 1)	10.8 (Note 1)	V

CD4000B NON-STANDARD DC ELECTRICAL SPECIFICATIONS "B" SERIES DEVICES (Continued)

PARAMETER		TEST CONDITIONS			-55°C	25°C		125°C	UNITS
		V_O	V_{IN}	V_{DD}	MIN/ MAX	MIN	MAX	MIN/ MAX	
Negative Trigger Threshold Voltage (Note 3)	V_N Min	-	-	5	0.9 (Note 1)	0.9 (Note 1)	-	0.9 (Note 1)	V
		-	-	10	2.5 (Note 1)	2.5 (Note 1)	-	2.5 (Note 1)	V
		-	-	15	4 (Note 1)	4 (Note 1)	-	4 (Note 1)	V
	V_N Max	-	-	5	2.8 (Note 1)	-	2.8 (Note 1)	2.8 (Note 1)	V
		-	-	10	5.2 (Note 1)	-	5.2 (Note 1)	5.2 (Note 1)	V
		-	-	15	7.4 (Note 1)	-	7.4 (Note 1)	7.4 (Note 1)	V
Hysteresis Voltage (Note 3)	V_H Min	-	-	5	0.3 (Note 1)	0.3 (Note 1)	-	0.3 (Note 1)	V
		-	-	10	1.2 (Note 1)	1.2 (Note 1)	-	1.2 (Note 1)	V
		-	-	15	1.6 (Note 1)	1.6 (Note 1)	-	1.6 (Note 1)	V
	V_H Max	-	-	5	1.6 (Note 1)	-	1.6 (Note 1)	1.6 (Note 1)	V
		-	-	10	3.4 (Note 1)	-	3.4 (Note 1)	3.4 (Note 1)	V
		-	-	15	5 (Note 1)	-	5 (Note 1)	5 (Note 1)	V
CD40107B									
Output Low Current, I_{OL} Min (Note 2)		0.4	0, 5	5	21	16 (Note 1)	-	12	mA
		1	0, 5	5	44	34 (Note 1)	-	25	mA
		0.5	0, 10	10	49	37 (Note 1)	-	28	mA
		1	0, 10	10	89	68 (Note 1)	-	51	mA
		0.5	0, 15	15	66	50 (Note 1)	-	38	mA
Output High Current, I_{OH} Min (Note 2)		No Internal Pull-Up Device							
Input Low Voltage, V_{IL} Max (Notes 2 and 6)		4.5	-	5	1.5 (Note 1)	-	1.5 (Note 1)	1.5 (Note 1)	V
		9	-	10	3.0	-	3.0	3.0	V
		13.5	-	15	4.0 (Note 1)	-	4.0 (Note 1)	4.0 (Note 1)	V
Input High Voltage, V_{IH} Max (Notes 2 and 6)		0.5, 4.5	-	5	3.5 (Note 1)	3.5 (Note 1)	-	3.5 (Note 1)	V
		1, 9	-	10	7.0	7.0	-	7.0	V
		1.5, 13.5	-	15	11 (Note 1)	11 (Note 1)	-	11 (Note 1)	V
CD40109B									
Input Low Voltage, V_{IL} Max (Note 2)		V_O	V_{CC}	V_{DD}					
		1, 9	5	10	1.5 (Note 1)	-	1.5 (Note 1)	1.5 (Note 1)	V
		1.5, 13.5	10	15	3 (Note 1)	-	3 (Note 1)	3 (Note 1)	V

CD4000B NON-STANDARD DC ELECTRICAL SPECIFICATIONS "B" SERIES DEVICES (Continued)

PARAMETER		TEST CONDITIONS V_O	V_{IN}	V_{DD}	-55°C MIN/MAX	25°C MIN	25°C MAX	125°C MIN/MAX	UNITS
Input High Voltage, V_{IH} Max (Note 2)		1, 9	5	10	3.5 (Note 1)	3.5 (Note 1)	-	3.5 (Note 1)	V
		1.5, 13.5	10	15	7 (Note 1)	7 (Note 1)	-	7 (Note 1)	V
CD40116									
Quiescent Current (Note 3) From V_{DD} Supply I_{DD} Max		Enable = 1 Enable = 0			6.5 (Note 1)	-	5 (Note 1)	5 (Note 1)	mA
From V_{CC} Supply I_{CC} Max					6.5 (Note 1)	-	5 (Note 1)	5 (Note 1)	mA
					100 (Note 1)	-	100 (Note 1)	200 (Note 1)	µA
DATA FLOW - CMOS INPUTS TO TTL OUTPUTS									
Input Current, I_{IN} (Note 2)		V_{IN} = 0, 12V			±60 (Note 1)	-	±60 (Note 1)	±60 (Note 1)	µA
Output Current (Note 2)	I_{OH} Min	V_{OH} = 3V, V_{IL} = 2V			-7.5 (Note 1)	-6 (Note 1)	-	-4.2 (Note 1)	mA
	I_{OL} Min	V_{OL} = 0.4V, V_{IH} = 10V			7.5 (Note 1)	6 (Note 1)	-	4.2 (Note 1)	mA
TTL Three-State Leakage Current, I_{OUT} Max (Note 2)		Enable = 0			±100 (Note 1)	-	±100 (Note 1)	±100 (Note 1)	µA
DATA FLOW - TTL INPUTS TO CMOS OUTPUTS									
Input Current (Note 2)	I_{IL} Max	Any TTL Input V_{IL} = 0 to 0.7V V_{IH} = 2.3V			-600 (Note 1)	-	-500 (Note 1)	-500 (Note 1)	µA
	I_{IH} Max				-450 (Note 1)	-	-350 (Note 1)	-350 (Note 1)	µA
Output Current (Note 2)	I_{OH} Min	V_{OH} = 11.5V, V_{IL} = 0.7V			-4.3 (Note 1)	-3.5 (Note 1)	-	-2.5 (Note 1)	mA
	I_{OL} Min	V_{OL} = 0.5V, V_{IH} = 2.3V			4.3 (Note 1)	3.5 (Note 1)	-	2.5 (Note 1)	mA
CMOS Three-State Output Leakage Current (Notes 2 and 8)		V_O = 0, 12V, V_{IN} = 0, 5V			±60	-	±60	±60	µA
ENABLE AND DISABLE INPUTS									
Input Current (Note 2)	I_{IL}	V_{IL} = 0 to 0.7V			-600 (Note 1)	-	-500 (Note 1)	-500 (Note 1)	µA
	I_{IH}	V_{IH} = 2.3V (TTL)			-450 (Note 1)	-	-350 (Note 1)	-350 (Note 1)	µA
	I_{IH}	V_{IH} = 12V (CMOS)			60	-	60	60	µA

NOTES:

1. These limits are tested 100%.
2. Replaces a STD parameter.
3. An Additive parameter.
4. Input on terminals 1, 5, 8, 12, or 2, 6, 9, 13; other inputs to V_{DD}.
5. Input on terminals 1 and 2, 5 and 6, 8 and 9, or 12 and 13; other inputs to V_{DD}.
6. Measured with external pull-up resistor, R_L = 10kΩ to V_{DD}.
7. At -55°C, test is performed with V_{DD} of 18V.
8. CMOS Three-State output leakage test is functionally identical to CMOS-to-TTL input current tests.

CD4000 SERIES SWITCHING CHARACTERISTICS at 25°C, V_{DD} = 5V, C_L = 50pF

TYPE	(NOTE 1) CONDITIONS	PROP DELAY (ns)	TRANS TIME (ns)	MAX CLK INPUT FREQ (MHz)
CD4001B	-	250	200	-
CD4001UB	-	120	200	-
CD4002B	-	250	200	-
CD4006B	-	400	200	2.5
CD4007UB	-	110	200	-
CD4008B	Sum In to Sum Out	800	200	-
	Carry In to Sum Out	740	-	-
	Sum In to Carry Out	400	-	-
	Carry In to Carry Out	200	-	-
CD4009UB	-	140 (Note 1)	350 (Note 1)	-
	-	60 (Note 2)	70 (Note 2)	-
CD4010B	-	200 (Note 1)	350 (Note 1)	-
	-	130 (Note 2)	70 (Note 2)	-
CD4011B	-	250	200	-
CD4011UB	-	120	200	-
CD4012B	-	250	200	-
CD4013B	Clock to Q or $\overline{Q}$	300	200	3.5
	Set to Q or Reset to $\overline{Q}$	300 (Note 1)	-	-
	Set to $\overline{Q}$ or Reset to Q	400 (Note 2)	-	-
CD4014B	-	320	200	3
CD4015B	Clock to Q	320	200	3
	Reset to Q	400 (Note 2)	-	-
CD4016B	Signal Input to Signal Output	100	-	-
	Turn On	70	-	-
CD4017B	Clock to Out	650	200	2.5
	Clock to Carry Out	600	-	-
	Reset to Out	530	-	-
CD4018B	Clock to Q	400	200	3
	Preset/Reset to Q	550	-	-
CD4019B	-	300	200	-
CD4020B	ϕ to Q1	360	200	3.5
	Qn to Qn + 1	330	-	-
	Reset to Q	280 (Note 2)	-	-
CD4021B	-	320	200	3
CD4022B	Clock to Carry Out	600	200	2.5
	Clock to Decode Out	650	-	-
	Reset to Output	530	-	-
CD4023B	-	250	200	-
CD4024B	ϕ to Q1	360	200	3.5
	Qn to Qn +1	330	-	-
	Reset to Q	280 (Note 2)	-	-
CD4025B	-	250	200	-

CD4000 SERIES SWITCHING CHARACTERISTICS at 25°C, V_{DD} = 5V, C_L = 50pF **(Continued)**

TYPE	(NOTE 1) CONDITIONS	PROP DELAY (ns)	TRANS TIME (ns)	MAX CLK INPUT FREQ (MHz)
CD4027B	Clock to Q or $\overline{Q}$	300	200	3.5
	Set to Q or Reset to $\overline{Q}$	300 (Note 1)	-	-
	Set to $\overline{Q}$ or Reset to Q	400 (Note 2)	-	-
CD4028B	-	350	200	-
CD4029B	Q Output	500	200	2
	Carry Output	560	-	-
	Preset Enable to Q	470	-	-
	Preset Enable to Carry Out	640	-	-
	Carry Input to Carry Out	340	-	-
CD4030B	-	280	200	-
CD4031B	Clock to $\overline{Q}$	500	200	2
	Clock to Q	500 (Note 1)	-	-
	Clock to Q	380 (Note 2)	-	-
	Clock to Q'	380	-	-
	$\overline{Clock}$ to C_{LD}	200	-	-
CD4033B	Clock to Carry Out	500	200	2.5
	Clock to Decode Out	700	-	-
	Reset to Carry Out	550 (Note 1)	-	-
	Reset to Decode Out	600	-	-
CD4034B	Parallel In to Parallel Out	700	200	2
	AE to "A" Out t_{PLZ}, t_{PZL}, t_{PHZ}, t_{PZH}	400	-	-
CD4035B	Clock to Q	500	200	2
	Reset to Q	460	-	-
CD4040B	ϕ to Q1	360	200	3.5
	Qn to Qn + 1	330	-	-
	Reset to Q	280 (Note 2)	-	-
CD4041UB	-	120	80	-
CD4042B	Data In to Q	220	200	-
	Data In to $\overline{Q}$	300	-	-
	Clock to Q	450	-	-
	Clock to $\overline{Q}$	500	-	-
CD4043B, CD4044B	Set or Reset to Q	300	200	-
	Enable to Q; t_{PHZ}, t_{PZH}	230	-	-
	Enable to Q; t_{PLZ}, t_{PZL}	180	-	-
CD4046B	AC Coupled Signal Input Voltage Sensitivity (Peak to Peak) f_{IN} = 100Hz Sine Wave	360mV Max		
CD4047B	t_R to Q, $\overline{Q}$	1000	200	-
	Astable to Q, $\overline{Q}$	700	-	-
	Retrigger to Q, $\overline{Q}$	600	-	-
	Astable to Oscillator	400	-	-
	Reset to Q, $\overline{Q}$	500	-	-
CD4048B	Ka to Output	600	200	-
CD4049UB	-	120 (Note 1)	160 (Note 1)	-
	-	65 (Note 2)	60 (Note 2)	-

CD4000 SERIES SWITCHING CHARACTERISTICS at 25°C, V_{DD} = 5V, C_L = 50pF **(Continued)**

TYPE	(NOTE 1) CONDITIONS	PROP DELAY (ns)	TRANS TIME (ns)	MAX CLK INPUT FREQ (MHz)
CD4050B	-	140 (Note 1)	160 (Note 1)	-
	-	110 (Note 2)	60 (Note 2)	-
CD4051B	Add to Signal Out	720	-	-
CD4052B, CD4053B	Inhibit to Signal Out - Channel On	720	-	-
	Inhibit to Signal Out - Channel Ott	450	-	-
CD4054B	V_{EE} = -5V	800	200	-
CD4056B	V_{EE} = -5V	1300	200	-
CD4060B	Input Pulse Operation ϕI to Q4	740	200	3.5
	Qn to Qn + 1	200	-	-
	Reset Operation	360 (Note 2)	-	-
CD4063B	Comparator Input to Output	1250	200	-
	Cascade Input to Output	1000	-	-
CD4066B	Signal Input to Signal Output R_L = 200k, $V_C = V_{DD}$, V_{SS} = GND, V_{IS} = Square Wave ≅ 5V and t_r, t_f = 20ns	40	-	-
	t_{PDC}; t_{RC}, t_{FC} = 20ns, R_L = 1K and V_{IS} < 5V	70	-	-
CD4067B	Add or Inhibit to Signal Out Channel On	650	-	-
	Signal In to Out	60	-	-
CD4068B	-	300	200	-
CD4069UB	-	110	200	-
CD4070B	-	280	200	-
CD4071B, CD4072B, CD4073B, CD4075B	-	250	200	-
CD4076B	Clock to Q	600	200	-
CD4077B	-	280	200	-
CD4078B	-	300	200	3
CD4081B, CD4082B	-	250	200	-
CD4085B, CD4086B	Data	450 (Note 2)	200	-
		620 (Note 1	-	-
	Inhibit	300 (Note 2)	-	-
		500 (Note 1)	-	-
CD4089B	Clock to Out	300	200	1.2
	Clear to Out	760	-	-
	Cascade to Out	180	-	-
CD4093B	-	380	200	-
CD4094B	Clock to Serial Out Qs	600	200	1.25
	Clock to Serial Out Q's	460	-	-
	Clock to Parallel Out	840	-	-
	Strobe to Parallel Out	580	-	-
	Out Enable to Parallel Out, t_{PHZ}, t_{PZH}	280	-	-
	Out Enable to Parallel Out, t_{PLZ}, t_{PZL}	200	-	-

CD4000 SERIES SWITCHING CHARACTERISTICS at 25°C, V_{DD} = 5V, C_L = 50pF **(Continued)**

TYPE	(NOTE 1) CONDITIONS			PROP DELAY (ns)	TRANS TIME (ns)	MAX CLK INPUT FREQ (MHz)
CD4098B	Trigger to Q, $\overline{Q}$			500	200	-
CD4099B	Data to Output			400	200	-
CD4502B	Data or Inhibit Delay Time			380 (Note 1)	200 (Note 1)	-
				270 (Note 2)	120 (Note 2)	-
	Disable Delay Time, t_{PHZ}			120	-	-
	Disable Delay Time, t_{PZH}			220	-	-
	Disable Delay Time, t_{PLZ}, t_{PZL}			250	-	-
CD4503B	-			150 (Note 1)	90 (Note 1)	-
	-			110 (Note 2)	70 (Note 2)	-
	t_{PHZ}, t_{PZH}			140	-	-
	t_{PLZ}, t_{PZL}			180	-	-
CD4504B	**SHIFT MODE**	**V_{CC}**	**V_{DD}**			
	TTL to CMOS $V_{DD} > V_{CC}$	5	10	280 (Note 2)	-	-
	CMOS to CMOS $V_{DD} > V_{CC}$	5	10	240 (Note 2)	-	-
	CMOS to CMOS $V_{CC} > V_{DD}$	10	5	550 (Note 2)	-	-
	TTL to CMOS $V_{DD} > V_{CC}$	5	10	280 (Note 1)	-	-
	CMOS to CMOS $V_{DD} > V_{CC}$	5	10	240 (Note 1)	-	-
	CMOS to CMOS $V_{CC} > V_{DD}$	10	5	400	-	-
	All Modes t_{THL}, t_{TLH}	-	5	200	-	-
		-	10	100	-	-
CD4508B	Strobe In to Data Out			260	200	-
CD4511B	Data to Output			1040 (Note 2)	310 (Note 2)	-
	-			1320 (Note 1)	80 (Note 1)	-
CD4512B	Inhibit to Output			280	200	-
	"A" Select to Output			400	-	-
	Data to Output			360	-	-
	t_{PHZ}, t_{PZH}			120	-	-
CD4514B, CD4515B	Strobe or Data			970	200	-
	Inhibit			500	-	-
CD4516B	Clock to Q Output			400	200	2
	Preset or Reset to Q			420	-	-
	Clock to Carry Out			480	-	-
	Carry In to Carry Out			250	-	-
	Preset or Reset to Carry Out			640	-	-
CD4517B	Clock to Q16			400	200	3
CD4518B, CD4520B	Clock to Output			560	200	1.5
	Reset to Output			650 (Note 2)	-	-
CD4532B	E_I to E_O, E_I to Gs			220	200	-
	Dn to Qm			440	-	-
	Dn to Gs, E_I to Qm			340	-	-

CD4000 SERIES SWITCHING CHARACTERISTICS at 25°C, V_{DD} = 5V, C_L = 50pF **(Continued)**

TYPE	(NOTE 1) CONDITIONS	PROP DELAY (ns)	TRANS TIME (ns)	MAX CLK INPUT FREQ (MHz)
CD4536B	Clock to Q1 8 Bypass High	2000	200	0.5
	Clock to Q1 8 Bypass Low	5000	-	-
	Clock to Q16	8000	-	-
	Reset to Qn	6000 (Note 2)	-	-
CD4541B	Clock to Q(2^8)	10500	200 (Note 2)	0.75
	Clock to Q(2^{16})	18000	360 (Note 1)	-
CD4555B, CD4556B	Select to Any Output	440	200	-
	$\overline{\text{Enable}}$ to Any Output	400	-	-
CD4585B	Comparator Inputs to Outputs	600	200	-
	Cascade Inputs to Outputs	400	-	-
CD4724B	Data to Outputs	400	200	-
	Write Disable to Output	400	-	-
	Reset to Output	350 (Note 2)	-	-
	Address to Output	450	-	-
CD14538B	Trigger to Q, $\overline{Q}$	600	200	-
	Reset to Q or $\overline{Q}$	500	-	-
CD40101B	Data In to Output	700	200	-
	Inhibit In to Output	280	-	-
CD40103B	Clock to Output	600	200	0.7
	Carry In/Counter Enable to Output	400	-	-
	Asynchronous Preset Enable to Output	1300 (Note 1)	-	-
	$\overline{\text{Clear}}$ to Output	750 (Note 2)	-	-
CD40105B	Shift Out or Reset to Data Out Ready	370 (Note 2)	200	1.5
	Shift In to Data In Ready	320 (Note 2)	-	-
	Three-State Control to Data Out t_{PZH}	280	-	-
	Ripple Thru Delay Input to Out t_{PLH}	4000 (Note 1)	-	-
CD40106B	-	280	200	-
CD40107B	R_L = 120Ω	200	100	-
CD40108B	Clock or Write Enable to Q	720	200	1.5
	Read or Write Address to Q	600	-	-
	Disable Delay Time, t_{PZH}, t_{PHZ}	200	-	-
	Disable Delay Time, t_{PZL}, t_{PLZ}	260	-	-

CD4000 SERIES SWITCHING CHARACTERISTICS at 25°C, V_{DD} = 5V, C_L = 50pF **(Continued)**

TYPE	(NOTE 1) CONDITIONS				PROP DELAY (ns)	TRANS TIME (ns)	MAX CLK INPUT FREQ (MHz)
CD40109B	DATA INPUT TO OUTPUT						
	SHIFT MODE		V_{CC}	V_{DD}			
	L-H		5V	10V	600 (Note 2)	100	-
	L-H		5V	10V	260 (Note 1)	-	-
	H-L		10V	5V	500 (Note 2)	200	-
	H-L		10V	5V	460 (Note 1)	-	-
	THREE-STATE DISABLE DELAY R_L = 1kΩ						
		SHIFT MODE	V_{CC}	V_{DD}			
	t_{PHZ}	L-H	5V	10V	120	-	-
	t_{PHZ}	H-L	10V	5V	400	-	-
	t_{PLZ}	L-H	5V	10V	740	-	-
	t_{PLZ}	H-L	10V	5V	500	-	-
	t_{PZH}	L-H	5V	10V	640	-	-
	t_{PZH}	H-L	10V	5V	600	-	-
	t_{PZL}	L-H	5V	10V	200	-	-
	t_{PZL}	H-L	10V	5V	400	-	-
CD40116	Data In to Data Out, CMOS In, TTL Out				35	40	-
	Data In to Data Out, TTL In, CMOS Out				45	-	-
	Disable to TTL Out, t_{PHZ}, t_{PLZ}				45	-	-
	Disable to TTL Out, t_{PZH}, t_{PZL}				50	-	-
	Enable to CMOS Out, t_{PHZ}, t_{PLZ}				30	-	-
	Enable to CMOS Out, t_{PZH}, t_{PZL}				60	-	-
CD40160B, CD40161B, CD40163B	Clock to Q				400	200	2
	Clock to C_{OUT}				450	-	-
	T_E to C_{OUT}				250	-	-
	Clear to Q (CD40160B and CD40161B Only)				500 (Note 2)	-	-
CD40174B	Clock to Output				300	200	3.5
	Clear to Output				200 (Note 2)	-	-
CD40192B, CD40193B	Clock Up or Clock Down to Q, Reset Q				500	200	2
	PE to Q				400	-	-
	Clock Up to Carry, Clock Down to Borrow				320	-	-
	Reset or PE to Borrow or Carry				600	-	-
CD40257B	Data Input to Output				300	200	-
	Select to Output				380	-	-
	Output Disable to Output				-	-	-
	t_{PZH}, t_{PHZ}				190	-	-
	t_{PZL}, t_{PLZ}				190	-	-

NOTES:

1. t_{TLH} or t_{PLH}.
2. t_{THL} or t_{PHL}.

CD54AC SERIES STANDARD DC ELECTRICAL SPECIFICATIONS

Non-standard DC Electrical Specifications are included in the individual data sheets.

PARAMETER	SYMBOL	TEST CONDITIONS V_I (V)	TEST CONDITIONS I_O (mA)	V_{CC} (V)	T_A = 25°C MIN	T_A = 25°C MAX	T_A = -55°C TO 125°C MIN	T_A = -55°C TO 125°C MAX	UNITS
High Level Input Voltage	V_{IH}			1.5	1.2	-	1.2	-	V
				3	2.1	-	2.1	-	V
				4.5	3.15 (Note 1)	-	3.15 (Note 1)	-	V
				5.5	3.85	-	3.85	-	V
Low Level Input Voltage	V_{IL}			1.5	-	0.3	-	0.3	V
				3	-	0.9	-	0.9	V
				4.5	-	1.35 (Note 1)	-	1.35 (Note 1)	V
				5.5	-	1.65	-	1.65	V
High Level Output Voltage	V_{OH}	V_{IH} or V_{IL} (Notes 2, 3)	-0.05	1.5	1.4	-	1.4	-	V
			-0.05	3	2.9	-	2.9	-	V
			-0.05	4.5	4.4	-	4.4	-	V
			-4	3	2.58	-	2.4	-	V
			-24	4.5	3.94 (Note 1)	-	3.7 (Note 1)	-	V
			-50	5.5	-	-	3.85	-	V
Low Level Output Voltage	V_{OL}	V_{IH} or V_{IL} (Notes 2, 3)	0.05	1.5	-	0.1	-	0.1	V
			0.05	3	-	0.1	-	0.1	V
			0.05	4.5	-	0.1	-	0.1	V
			12	3	-	0.36	-	0.5	V
			24	4.5	-	0.36 (Note 1)	-	0.5 (Note 1)	V
			50	5.5	-	-	-	1.65	V
Input Leakage Current	I_I	V_{CC} or GND		5.5	-	±0.1 (Note 1)	-	±1.0 (Note 1)	µA
Three-State Leakage Current (Note 4)	I_{OZ}	V_{IH} or V_{IL} $V_O = V_{CC}$ or GND		5.5	-	±0.5 (Note 1)	-	±10 (Note 1)	µA
Quiescent Supply Current (Note 5) MSI	I_{CC}	V_{CC} or GND	0	5.5	-	8 (Note 1)	-	160 (Note 1)	µA
SSI/FF			0	5.5	-	4 (Note 1)	-	80 (Note 1)	µA

NOTES:

1. These limits are tested 100%.
2. Test one output at a time for a 1s maximum duration. Measurement is made by forcing current and measuring voltage to minimize power dissipation.
3. Test verifies a minimum transmission-line-drive capability of 75Ω for 54AC/ACT Series.
4. Individual data sheets will indicate where applicable.
5. Individual data sheets will indicate complexity.

CD54ACT SERIES STANDARD DC ELECTRICAL SPECIFICATIONS

Non-standard DC electrical specifications are included in the individual data sheets.

PARAMETER	SYMBOL	TEST CONDITIONS		V_{CC} (V)	T_A = 25°C		T_A = -55°C TO 125°C		UNITS
		V_I (V)	I_O (mA)		MIN	MAX	MIN	MAX	
High Level Input Voltage	V_{IH}			4.5 to 5.5	2 (Note 1)	-	2 (Note 1)	-	V
Low Level Input Voltage	V_{IL}			4.5 to 5.5	-	0.8 (Note 1)	-	0.8 (Note 1)	V
High Level Output Voltage	V_{OH}	V_{IH} or V_{IL} (Note 2 and Note 3)	-0.05	4.5	4.4	-	4.4	-	V
			-24	4.	3.94 (Note 1)	-	3.7 (Note 2)	-	V
			-50	5.5	-	-	3.85	-	V
Low Level Output Voltage	V_{OL}	V_{IL} or V_{IH} (Note 2 and Note 3)	0.05	4.5	-	0.1	-	0.1	V
			24	4.5	-	0.36 (Note 1)	-	0.5 (Note 1)	V
			50	5.5	-	-	-	1.65	V
Input Leakage Current	I_I	V_{CC} or GND		5.5	-	±0.1 (Note 1)	-	±1.0 (Note 1)	µA
Three-State Leakage Current (Note 4)	I_{OZ}	V_{IH} or V_{IL} V_O = V_{CC} or GND		5.5	-	±0.5 (Note 1)	-	±10 (Note 1)	µA
Quiescent Supply Current (Note 5) MSI	I_{CC}	V_{CC} or GND	0	5.5	-	8 (Note 1)	-	160 (Note 1)	µA
SSI/FF				5.5	-	4 (Note 1)	-	80 (Note 1)	µA
Additional Supply Current per Input Pin, TTL Inputs High, 1 Unit Load	ΔI_{CC}	V_{CC} - 2.1		4.5 to 5.5	-	2.4	-	3	mA

NOTES:

1. These limits are tested 100%.
2. Test one output at a time for a 1s maximum duration. Measurement is made by forcing current and measuring voltage to minimize power dissipation.
3. Test verifies a minimum transmission-line-drive capability of 75Ω for CD54AC/ACT Series.
4. Individual data sheet will indicate open-drain types.
5. Individual data sheet will indicate complexity.

CD54HC SERIES STANDARD DC ELECTRICAL SPECIFICATIONS

Non-standard DC Electrical Specifications are included in individual data sheets.

PARAMETER		SYMBOL	TEST CONDITIONS			T_A = 25°C		T_A = -55°C TO 125°C		UNITS
			V_{IN} (V)		V_{CC} (V)	MIN	MAX	MIN	MAX	
High Level Input Voltage		V_{IH}			2	1.5	-	1.5	-	V
					4.5	3.15 (Note 1)	-	3.15 (Note 1)	-	V
					6	4.2	-	4.2	-	V
Low Level Input Voltage		V_{IL}			2	-	0.5	-	0.5	V
					4.5	-	1.35 (Note 1)	-	1.35 (Note 1)	V
					6	-	1.8	-	1.8	V
High Level Output Voltage	CMOS Loads	V_{OH}	V_{IL} or V_{IH}	I_O = -20µA	2	1.9	-	1.9	-	V
					4.5	4.4 (Note 1)	-	4.4 (Note 1)	-	V
					6	5.9	-	5.9	-	V
	TTL Loads (Table 1)	V_{OH}	V_{IL} or V_{IH}	I_O (mA) STD / BUS						
				-4 / -6	4.5	3.98 (Note 1)	-	3.7 (Note 1)	-	V
				-5.2 / -7.8	6	5.48	-	5.2	-	V
Low Level Output Voltage	CMOS Loads	V_{OL}	V_{IL} or V_{IH}	I_O = 20µA	2	-	0.1	-	0.1	V
					4.5	-	0.1 (Note 1)	-	0.1 (Note 1)	V
					6	-	0.1	-	0.1	V
	TTL Loads (Table 1)		V_{IL} or V_{IH}	I_O (mA) STD / BUS						
				4 / 6	4.5	-	0.26 (Note 1)	-	0.4 (Note 1)	V
				5.2 / 7.8	6	-	0.26	-	0.4	V
Input Leakage Current		I_{IN}	V_{CC} or GND		6	-	±0.1 (Note 1)	-	±1.0 (Note 1)	µA
Quiescent Supply Current (Note 2)	SSI	I_{CC}	V_{CC} or GND	I_{OUT} = 0	6	-	2 (Note 1)	-	40 (Note 1)	µA
	FF				6	-	4 (Note 1)	-	80 (Note 1)	µA
	MSI				6	-	8 (Note 1)	-	160 (Note 1)	µA
Three-State Leakage Current (Note 3)		I_{OZ}	V_{IL} or V_{IH}	V_O = V_{CC} or GND	6	-	±0.5 (Note 1)	-	±10 (Note 1)	µA

NOTES:

1. These limits are tested 100%.
2. Listed in individual data sheets.
3. Individual data sheets will indicate where applicable.

CD54HCT SERIES STANDARD DC ELECTRICAL SPECIFICATIONS

Non-standard DC Electrical Specifications are included in individual data sheets.

PARAMETER		SYMBOL	TEST CONDITIONS			T_A = 25°C		T_A = -55°C TO 125°C		UNITS
			V_{IN} (V)		V_{CC} (V)	MIN	MAX	MIN	MAX	
High Level Input Voltage		V_{IH}			4.5	2 (Note 1)	-	2 (Note 1)	-	V
					5.5	2	-	2	-	V
Low Level Input Voltage		V_{IL}			4.5	-	0.8 (Note 1)	-	0.8 (Note 1)	V
					5.5	-	0.8	-	0.8	V
High Level Output Voltage	CMOS Loads	V_{OH}	V_{IL} or V_{IH}	I_O = -20µA	4.5	4.4 (Note 1)	-	4.4 (Note 1)	-	V
	TTL Loads (Table 1)		V_{IL} or V_{IH}	I_O (mA) STD	I_O (mA) BUS					
				-4	-6	4.5	3.98 (Note 1)	-	3.7 (Note 1)	-	V
Low Level Output Voltage	CMOS Loads	V_{OL}	V_{IL} or V_{IH}	I_O = 20µA		4.5	-	0.1 (Note 1)	-	0.1 (Note 1)	V
	TTL Loads (Table 1)		V_{IL} or V_{IH}	I_O (mA) STD	I_O (mA) BUS					
				4	6	4.5	-	0.26 (Note 1)	-	0.4 (Note 1)	V
Input Leakage Current		I_{IN}	V_{CC} or GND			6	-	±0.1 (Note 1)	-	±1.0 (Note 1)	µA
Quiescent Supply Current (Note 2)	SSI	I_{CC}	V_{CC} or GND	I_{OUT} = 0		6	-	2 (Note 1)	-	40 (Note 1)	µA
	FF					6	-	4 (Note 1)	-	80 (Note 1)	µA
	MSI					6	-	8 (Note 1)	-	160 (Note 1)	µA
Three-State Leakage Current (Note 3)		I_{OZ}	V_{IL} or V_{IH}	V_O = V_{CC} or GND		6	-	±0.5 (Note 1)	-	±10 (Note 1)	µA

NOTES:

1. These limits are tested 100%.
2. Listed in individual data sheets.
3. Individual data sheets will indicate where applicable.

CD54HC/HCT SERIES STANDARD TTL OUTPUT LOAD CHARACTERISTICS (Note 1)

PARAMETER	SYMBOL	TEMP	TEST CONDITIONS					LIMITS		UNITS
			HC/HCT			V_{IN}				
						HC	HCT			
			V_{CC}	V_O	I_O	V_{IL} OR V_{IH}	V_{IL} OR V_{IH}	MIN	MAX	
Output High (Source) Current, TTL Load	I_{OH}	25°C	4.5	3.98	-	0, 4.5	0, 4.5	-4 (Note 2)	-	mA
		-55°C	4.5	3.70	-	0, 4.5	0, 4.5	-4 (Note 2)	-	mA
		125°C	4.5	3.70	-	0, 4.5	0, 4.5	-4 (Note 2)	-	mA
Output Low (Sink) Current, TTL Load	I_{OL}	25°C	4.5	0.26	-	0, 4.5	0, 4.5	4 (Note 2)	-	mA
		-55°C	4.5	0.40	-	0, 4.5	0, 4.5	4 (Note 2)	-	mA
		125°C	4.5	0.40	-	0, 4.5	0, 4.5	4 (Note 2)	-	mA
High Level Output Voltage, TTL Load	V_{OH}	25°C	4.5	-	-4	1.35, 3.15	0.8, 2.0	3.98 (Note 2)	-	V
		-55°C	4.5	-	-4	1.35, 3.15	0.8, 2.0	3.70 (Note 2)	-	V
		125°C	4.5	-	-4	1.35, 3.15	0.8, 2.0	3.70 (Note 2)	-	V
Low Level Output Voltage, TTL Load	V_{OL}	25°C	4.5	-	4	1.35, 3.15	0.8, 2.0	-	0.26 (Note 2)	V
		-55°C	4.5	-	4	1.35, 3.15	0.8, 2.0	-	0.40 (Note 2)	V
		125°C	4.5	-	4	1.35, 3.15	0.8, 2.0	-	0.40 (Note 2)	V

NOTES:

1. Individual data sheets will indicate the non-standard bus-driver types which will display different TTL output load characteristics.
2. These limits are tested 100%.

MILITARY IC TEST FLOWS

MIL-PRF-38535 CLASS Q

SCREENING TEST	CONDITIONS	METHOD	COMPLIANT	NON-COMPLIANT			
			JAN, /883, /3A, SMD	-8, /8	/3	/HR	/3W
Internal Visual Inspection	Condition B	2010	X	X	X	X	X
Temperature Cycle	Condition C	1010	X	X	X	X	X
Constant Acceleration	Condition E, YI only	2001	X	X	X	X	X
Fine Leak Test	Condition B	1014	X	X	X	X	X
Gross Leak Test	Condition C	1014	X	X	X	X	X
Pre Burn-In Elec Test	Per Applicable Device Specification	-	X	X	X	X	X
Burn-In Test	160 Hrs at 125°C or equivalent	1015	X	X	X	X	X
Post BI Elec Test at 25°C	Per Applicable Device Specification	-	X	X	X	X	X
Percent Defective	5%, Subgroup I	-	X	X	Note 1	Note 1	Note 1
Static Test at 125°C	Per Applicable Device Specification	-	X	X	X	X	-
Static Test at -55°C	Per Applicable Device Specification	-	X	X	X	X	-
Dynamic or Functional at 25°C	Per Applicable Device Specification	-	X	X	X	X	X
Dynamic or Functional at 125°C	Per Applicable Device Specification	-	X	X	X	X	-
Dynamic or Functional at -55°C	Per Applicable Device Specification	-	X	X	X	X	-
Switching Test at 25°C (Note 2)	Per Applicable Device Specification	-	X	X	X	X	X
QCI - Group A Inspection	-	-	X	X	X	Note 3	Note 4
QCI - Group B Inspection	-	-	X	Note 5	Note 5	Note 6	Note 5
QCI - Group C Inspection (Note 7)	-	-	X	Note 5	Note 5	Note 6	Note 5
QCI - Group D Inspection (Note 7)	-	-	X	Note 5	Note 5	Note 6	Note 5
External Visual Inspection	-	2009	X	X	X	X	X

NOTES:

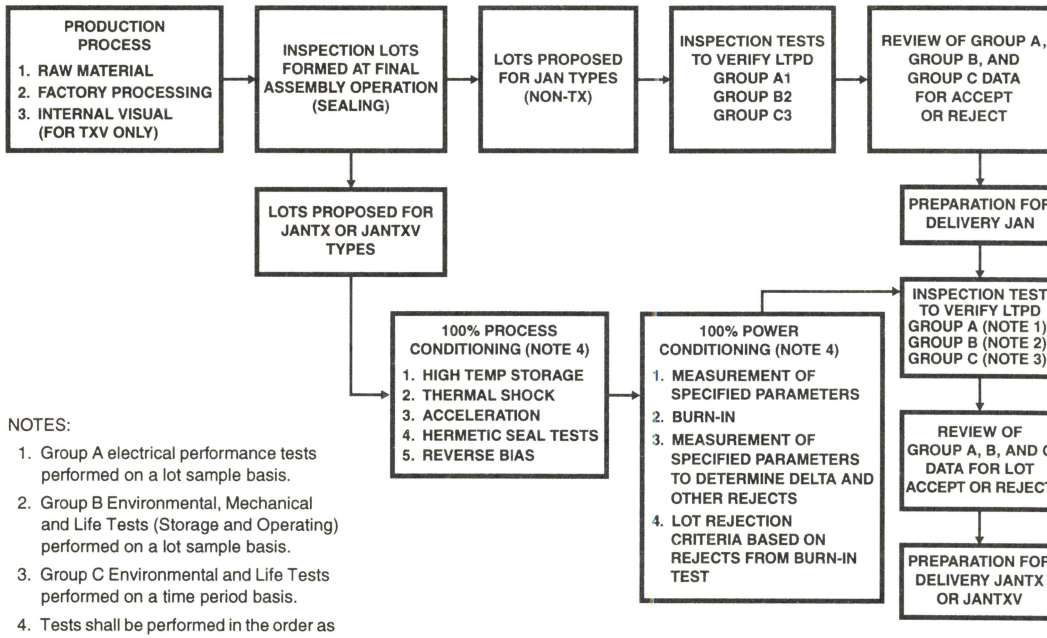
1. For all types except CA3XXX, PDA is 5%, one reburn-in allowed at 3%. For CA3XXX series device types, PDA is 10%, one reburn-in allowed at 7%. PDA is in accordance with MIL-PRF-38535.
2. Switching tests are not applicable for linear device types.
3. LTPD = 5 for Subgroup 17 and 9; LTPD = 7 for Subgroups 2 and 3; LTPD = 1- for Subgroups 8A and 8B.
4. For /3W, Group A performed at 25°C only.
5. Group B, C, and D inspection performed only when specified on purchase order. Generic data is not maintained.
6. Generic data available.
7. Group A, B, C, and D performed per MIL-PRF-38535 Class Q and the Harris Quality Management Plan.

MILITARY POWER MOSFET FLOW CHART

JAN, JANTX, JANTXV, 2NXXXX Series Devices

MIL-PRF-19500 is the specification for the familiar "JAN" type discrete semiconductor devices. Detailed Electrical Specifications are prepared as needed by the three military services and coordinated by the Defense Electronic Supply Center (DESC). Levels of reliability are defined by MIL-PRF-19500. JAN types receive Group A, Group B, and Group C lot sampling only, and are subjected to lot rejection based on delta parameter criteria in addition to Group A, Group B, and Group C lot sampling. JANTXV types are subjected to 100% (JTXV) internal visual inspection in addition to all of the JANTX tests in accordance with MIL-STD-750 test methods and MIL-PRF-19500.

DESC publishes "QPL-19500", a Qualified Products List of all types and suppliers approved to produce and brand devices in accordance with MIL-PRF-19500.



NOTES:

1. Group A electrical performance tests performed on a lot sample basis.
2. Group B Environmental, Mechanical and Life Tests (Storage and Operating) performed on a lot sample basis.
3. Group C Environmental and Life Tests performed on a time period basis.
4. Tests shall be performed in the order as shown.

Rad Hard Selection Guide

DESCRIPTION	PART NUMBER
DATA ACQUISITION	
A/D CONVERTERS	
8-Bit, 20MHz, Flash	HS-9008RH
D/A CONVERTERS	
12-Bit, 4MHz, with Reference	HS-565ARH
MULTIPLEXERS	
Single, 8-Channel	HS-508RH
Single, 8-Channel, with OV Protection	HS-508ARH
Single, 8-Channel, with OV Protection, R_{ON} Match	HS-548RH
Single, 16-Channel, with OV Protection	HS-1840ARH
Single, 16-Channel, OV Protection, R_{ON} Match	HS-546RH
Differential, 4-Channel	HS-509RH
Differential, 4-Channel, OV Protection, R_{ON} Match	HS-549RH
Differential, 8-Channel, OV Protection, R_{ON} Match	HS-547RH
SWITCHES	
Dual, DPST	HS-302RH
Dual, SPDT	HS-303RH
Dual, SPDT	HS-307RH
Dual, SPDT	HS-390RH
DATA BUS	
RECEIVERS	
RS422 CMOS Line Receiver	HS-26C32RH
RS422 CMOS Line Receiver, with TTL Inputs	HS-26CT32RH
Triple Line Receiver	HS-246RH
Triple Party Line Receiver, Hi-Z Inputs	HS-248RH
TRANSMITTERS	
RS422 CMOS Line Transmitter	HS-26C31RH
RS422 CMOS Line Transmitter, with TTL Inputs	HS-26CT31RH
Triple Line Transmitter	HS-245RH

DESCRIPTION	PART NUMBER
LINEAR	
OP AMPS	
Single, 12MHz, 60V/µs	HS-2510RH
Single, 20MHz, 120V/µs	HS-2520RH
Single, 80MHz, 20V/µs, Precision	HS-2620RH
Single, 80MHz, 20V/µs, Precision	HS-2622RH
Single, 360MHz, 1000V/µs, Disable	HS-1145RH
Single, 360MHz, 1000V/µs, Disable	HS-1410RH
Single, 360MHz, 1200Vµs, V_{OUT} Limit	HS-1135RH
Single, 850MHz, 2300V/µs	HS-1100RH
Single, 850MHz, 2300V/µs, with Balance Pins	HS-1120RH
Single, General Purpose/Precision	HS-2600RH
Single, Low Power, 150µA	HS-2700RH
Dual, 100MHz, 20V/µs	HS-22620RH
Dual, 530MHz, 1050V/µs, Disable	HS-1245RH
Quad, 4-Channel Selectable, Low Power	HS-2400RH
Quad, Low Noise, 6nV, 8MHz, 3V/µs	HS-5104ARH
BUFFERS	
Single, 225MHz, Programmable Gain, V_{OUT} Limit.	HS-1115RH
Dual, 340MHz, Programmable Gain	HS-1212RH
Quad, 225MHz, Programmable Gain	HS-1412RH
HIGH FREQUENCY TRANSISTOR ARRAY	
5 NPN Array, 8GHz, 3.5dB Noise	HS-6254RH
SAMPLE & HOLD	
Sample and Hold, 2.5MHz, 3.2µs	HS-2420RH
LOGIC, ACS	
BUFFERS	
Buffer, Quad, Non-Inverting, Three-State	ACS125
Buffer/Line Driver, Octal, Three-State	ACS541
COUNTERS	
Counter, 4-Bit, Synchronous, Binary	ACS161
FLIP-FLOPS	
Flip-Flop, Dual, J-K, with Set and Reset	ACS112

DESCRIPTION	PART NUMBER
Flip-Flop, Dual, with Set and Reset	ACS74
Flip-Flop, Octal, D-Type, Three-State	ACS374
GATES	
AND Gate, Quad, 2-Input	ACS08
Exclusive-OR Gate, Quad, 2-Input	ACS86
NAND Gate, Dual, 4-Input	ACS20
NAND Gate, Quad, 2-Input	ACS00
NAND Gate, Triple, 2-Input	ACS10
NAND Gate, Quad, 2-Input, with Open Drain	ACS03
LATCHES	
Latch, Octal, Transparent, Three-State	ACS373
Latch, Octal, Transparent, Three-State	ACS573
MULTIPLEXERS	
8-Input Multiplexer	ACS151
Dual 4-Input Three-State	ACS253
Quad 2-Input	ACS157
Quad 2-Input Tri-State	ACS257
Single, 3-to-8 Line Decoder/Demux	ACS138
Dual 2-to-4 Line Decoder/Demux	ACS139
SPECIAL FUNCTION	
Bus Tranceiver, Octal, Non-Inverting, Three-State	ACS245
Bus Tranceiver, Octal, Non-Inverting, Three-State	ACS245A
Comparator, 8-Bit, Magnitude	ACS521
Error Detection/Correction Circuit, Three-State	ACS630
Parity Generator/Checker, 9-Bit, Odd/Even	ACS280
LOGIC, ACTS	
BUFFERS	
Buffer, Quad, Non-Inverting, Three-State, with TTL Inputs	ACTS125
Buffer, Octal, Three-State, Inverting, with TTL Inputs	ACTS240
Buffer, Octal, Three-State, with TTL Inputs	ACTS244
Buffer/Line Driver, Octal, Three-State, with TTL Inputs	ACTS541

DESCRIPTION	PART NUMBER
COUNTERS	
Counter, 4-Bit, Synchronous, Binary, with TTL Inputs	ACTS161
FLIP-FLOPS, 10 to 4-Line	
Flip-Flop, Dual, J-K, with Set and Reset, with TTL Inputs	ACTS112
Flip-Flop, Dual, with Set and Reset, with TTL Inputs	ACTS74
Flip-Flop, Octal, D Type, Three-State, with TTL Inputs	ACTS374
GATES	
AND Gate, Quad, 2-Input, with TTL Inputs	ACTS08
Exclusive-OR Gate, Quad, 2-Input, with TTL Inputs	ACTS86
NAND Gate, Dual, 4-Input, with TTL Inputs	ACTS20
NAND Gate, Triple, 2-Input, with TTL Inputs	ACTS10
LATCHES	
Latch, Octal, Transparent, Three-State, with TTL Inputs	ACTS373
Latch, Octal, Transparent, Three-State, with TTL Inputs	ACTS573
MULTIPLEXERS	
Single 3-to-8 Line Decoder/Demux, with TTL Inputs	ACTS138
SPECIAL FUNCTION	
Bus Tranceiver, Octal, Three-State, with TTL Inputs	ACTS245
Error Detector/Corrector, Three-State, with TTL Inputs	ACTS630
Inverter, Hex, TTL Inputs, with TTL Inputs	ACTS04
Parity Generator/Checker, 9-Bit, with TTL Inputs	ACTS280
LOGIC, CD4xxxBMS	
BUFFERS	
Buffer, Quad, True/Complement, Unbuffered	CD4041UBMS, NS
Buffer, Hex, Non-Inverting	CD4503BMS, NS
Buffer/Converter, Hex, Inverting, Unbuffered	CD4009UBMS

DESCRIPTION	PART NUMBER
Buffer/Converter, Hex, Inverting, Unbuffered	CD4049UBMS, NS
Buffer/Converter, Hex, Non-Inverting	CD4010BMS
Buffer/Converter, Hex, Non-Inverting	CD4050BMS, NS
COUNTERS	
Counter, 4-Bit, BCD, Up/Down, Presettable	CD4510BMS
Counter, 4-Bit, Binary, Up/Down, Presettable	CD4516BMS, NS
Counter, 4-Bit, Binary, with Async Clear	CD40161BMS, NS
Counter, 4-Bit, Binary, with Sync Clear	CD40163BMS
Counter, 4-Bit, Decade, with Async Clear	CD40160BMS
Counter, 4-Bit, Decade, with Sync Clear	CD40162BMS
Counter, 8-Stage Down, Dual 4-Bit BCD	CD40102BMS
Counter, 8-Stage Down, Single 8-Bit Binary	CD40103BMS
Counter, Decade, with Reset	CD4017BMS, NS
Counter, Dual, Up, BCD	CD4518BMS
Counter, Dual, Up, Binary	CD4520BMS, NS
Counter, Octal, with Reset	CD4022BMS, NS
Counter, Presettable Up/Down, BCD Type	CD40192BMS
Counter, Presettable Up/Down, Binary Type	CD40193BMS
Counter, Presettable Up-Down	CD4029BMS, NS
Counter, Presettable, Divide by N	CD4018BMS, NS
Counter, Ripple-Carry, Binary, 7-Stage	CD4024BMS, NS
Counter, Ripple-Carry, Binary, 12-Stage	CD4040BMS, NS
Counter, Ripple-Carry, Binary, 14-Stage	CD4020BMS, NS
Counter, Ripple-Carry, Binary, 14-Stage, with Oscillator	CD4060BMS
Counter/Divider, Decade	CD4033BMS
DECODERS/ENCODERS	
Decoder, 4-to16 Line, Latching, with Inhibit High	CD4514BMS, NS
Decoder, 4-to16 Line, Latching, with Inhibit Low	CD4515BMS, NS
Decoder, BCD-to-Decimal	CD4028BMS, NS
Decoder, Dual, Binary-to-1 of 4, Outputs High	CD4555BMS, NS
Decoder, Dual, Binary-to-1 of 4, Outputs Low	CD4556BMS, NS
Encoder, Priority, 8-Bit-to-Binary	CD4532BMS, NS
Encoder, Priority, 10-to-4 Line, BCD	CD40147BMS
FLIP-FLOPS	
Flip-Flop, Dual, D-Type with Set/Reset	CD4013BMS, NS
Flip-Flop, Dual, J-K, with Set and Reset	CD4027BMS, NS
Flip-Flop, Quad, D-Type	CD40175BMS
Flip-Flop, Hex, D-Type	CD40174BMS, NS
Flip-Flops, Gated J-K, Inverting	CD4096BMS
Flip-Flops, Gated J-K, Non-Inverting	CD4095BMS
GATES	
AND Gate, Dual, 4-Input	CD4082BMS, NS
AND Gate, Triple, 3-Input	CD4073BMS, NS
AND Gate, Quad, 2-Input	CD4081BMS, NS
AND/OR Select Gate, Quad	CD4019BMS, NS
AND/OR/INVERT Gate, Dual, 2-Wide, 2-Input	CD4085BMS
AND/OR/INVERT Gate, 4-Wide, 2-Input	CD4086BMS
NAND Gate, Dual, 2-Input Buffer/Driver	CD40107BMS.NS
NAND Gate, Dual, 4-Input	CD4012BMS, NS
NAND Gate, Triple, 3-Input	CD4023BMS, NS
NAND Gate, Quad, 2-Input	CD4011BMS, NS
NAND Gate, Quad, R/S Latches, Three-State Outputs	CD4044BMS
NAND Schmitt Triggers, Quad, 2-Input	CD4093BMS, NS
NAND/AND Gate, 8-Input	CD4068BMS, NS
NOR Gate, Dual, 4-Input	CD4002BMS, NS
NOR Gate, Dual, 3-Input, Plus Inverter	CD4000BMS
NOR Gate, Triple, 3-Input	CD4025BMS, NS
NOR Gate, Quad, 2-Input	CD4001BMS, NS
NOR Gate, Quad, Exclusive	CD4077BMS, NS
NOR Gate, Quad, R/S Latches, Three-State Outputs	CD4043BMS, NS
NOR/OR Gate, 8-Input	CD4078BMS, NS

DESCRIPTION	PART NUMBER
OR Gate, Dual, 4-Input	CD4072BMS, NS
OR Gate, Triple, 3-Input	CD4075BMS, NS
OR Gate, Quad, 2-Input	CD4071BMS, NS
OR Gate, Quad, Exclusive	CD4030BMS, NS
OR Gate, Quad, Exclusive	CD4070BMS, NS
Gate, 8-Input, Multifunction, Expandable	CD4048BMS
INVERTERS	
Inverter, Hex, Unbuffered	CD4069UBMS, NS
Inverter/Buffer, Hex, Strobed	CD4502BMS, NS
LATCHES	
Latch, 8-Bit, Addressable	CD4099BMS
Latch, 8-Bit, Addressable	CD4724BMS
Latch, Decoder/Driver, BCD-to-7-Segment	CD4511BMS
Latch, Dual, 4-Bit	CD4508BMS, NS
Latch, Quad, Clocked D	CD4042BMS, NS
LEVEL SHIFTERS	
Level Shifter, Quad, Low-to-High	CD40109BMS, NS
Level Shifter, Hex, TTL/CMOS or CMOS/CMOS	CD4504BMS
MULTIPLEXERS	
Multiplexer, Single, 8-Channel, Data Selector, Three-State	CD4512BMS, NS
Multiplexer, Single, 8-Channel, Analog	CD4051BMS, NS
Multiplexer, Single, 16-Channel, Analog	CD4067BMS
Multiplexer, Triple, 2-Channel, Analog	CD4053BMS, NS
Multiplexer, Quad, 2-Input	CD40257BMS, NS
Multiplexer, Differential, 4-Channel, Analog	CD4052BMS, NS
Multiplexer, Differential, 8-Channel, Analog	CD4097BMS
REGISTERS	
Register, 4-Bit, Three-State Outputs	CD4076BMS, NS
Register, 4 x 4, Multiport	CD40208BMS
Register, 4 x 4, Multiport	CD40108BMS
Register, FIFO, 4-Bit x 16 Word	CD40105BMS, NS
Register, Shift and Store, Bus, 8-Stage	CD4094BMS, NS
Register, Shift, 4-Stage, Parallel I/O	CD4035BMS, NS
Register, Shift, Static, 8-Stage	CD4014BMS, NS
Register, Shift, Static, 8-Stage	CD4021BMS, NS
Register, Shift, Static, 8-Stage	CD4034BMS
Register, Shift, Static, 18-Stage	CD4006BMS.NS
Register, Shift, Static, 64-Stage	CD4031BMS, NS
Register, Shift, Static, Dual, 4-Stage,	CD4015BMS, NS
Register, Shift, Static, Dual, 64-Stage	CD4517BMS
Register, Shift, Universal, 4-Bit, Bidirectional	CD40104BMS
Register, Shift, Universal, 4-Bit, Bidirectional	CD40194BMS
SWITCHES	
Switch, Quad, Bilateral	CD4016BMS
Switch, Quad, Bilateral	CD4066BMS, NS
SPECIAL FUNCTION	
Adder, Full 4-Bit, with Parallel Carry Out	CD4008BMS, NS
Arithmetic Logic Unit, 4-Bit	CD40181BMS
Carry Generator, Look-Ahead	CD40182BMS
Comparator, 4-Bit, Magnitude	CD4585BMS
Comparator, Magnitude, 4-Bit	CD4063BMS
Complimentary Pair, Dual and Inverter	CD4007UBMS
Multivibrator, Dual, Monostable	CD4098BMS, NS
Multivibrator, Low Power, Monostable/ Astable	CD4047BMS, NS
Parity Generator/Checker, 9-Bit	CD40101BMS
Phase Locked Loop, Micropower	CD4046BMS, NS
Rate Multiplier, BCD	CD4527BMS
Rate Multiplier, Binary	CD4089BMS
Schmitt Trigger, Hex	CD40106BMS, NS
Timer, Programmable, 24-Stage	CD4536BMS

LOGIC, HCS

BUFFERS	
Buffer, Quad, Three-State	HCS125
Buffer, Octal, Three-State, Inverting	HCS240
Buffer, Octal, Three-State, Inverting	HCS241
Buffer, Octal, Three-State, Non-Inverting	HCS244

DESCRIPTION	PART NUMBER
COUNTERS	
Counter, 4-Bit, Sync, Binary	HCS161
Counter, 4-Bit, Sync, Binary, Presettable	HCS163
Counter, Decade, Sync, BCD	HCS160
Counter, Up-Down, Sync, 4-Bit, BCD	HCS190
Counter, Up-Down, Sync, 4-Bit, Binary	HCS193
DECODERS	
Decoder/Demux, 2-to-4 Line, Inverting	HCS139
Decoder/Demux, 3-to-8 Line, Inverting	HCS138
Decoder/Demux, 4-to-16 Line, Inverting	HCS154
FLIP-FLOPS	
Flip-Flop, Dual D-Type, with Set and Reset	HCS74
Flip-Flop, Dual, J-K, with Set and Reset, Negative Edge	HCS112
Flip-Flop, Dual, J-K, with Set and Reset, Positive Edge	HCS109
Flip-Flop, Octal, D Type, Three-State	HCS374
Flip-Flop, Octal, D Type, with Reset	HCS273
GATES	
AND Gate, Dual, 4-Input	HCS21
AND Gate, Triple, 3-Input	HCS11
AND Gate, Quad, 2-Input	HCS08
Exclusive-OR Gate, Quad, 2-Input	HCS86
NAND Gate, Dual, 4-Input	HCS20
NAND Gate, Triple, 3-Input	HCS10
NAND Gate, Quad, 2-Input	HCS00
NAND Schmitt Trigger, Quad, 2-Input	HCS132
NOR Gate, Triple, 3-Input	HCS27
NOR Gate, Quad, 2-Input	HCS02
OR Gate, Quad, 2-Input	HCS32
INVERTERS	
Inverter, Hex	HCS04
Inverter, Hex, with Open Drain Outputs	HCS05
LATCHES	
Latch, Octal, Transparent, Three-State	HCS373
Latch, Octal, Transparent, Three-State	HCS573

DESCRIPTION	PART NUMBER
MULTIPLEXERS	
Multiplexer, Single, 8-Input	HCS151
Multiplexer, Dual, 4-Input, Three-State	HCS253
Multiplexer, Quad, 2-Input	HCS157
REGISTERS	
Register, Shift, 4-Bit, Parallel Access	HCS195
Register, Shift, 8-Bit, Parallel-In/Serial-Out	HCS166
Register, Shift, 8-Bit, Parallel-In/Serial-Out Inverter	HCS165
Register, Shift, 8-Bit, Serial-In/Parallel-Out Inverter	HCS164
SPECIAL FUNCTION	
Bus Tranceiver, Octal, Three-State	HCS245
Full Adder, 4-Bit, Binary, with Carry	HCS283
Schmitt Trigger, Hex, Inverting	HCS14
LOGIC, HCTS	
BUFFERS	
Buffer, Hex, Three-State	HCTS365
Buffer, Octal, Three-State,	HCTS541
Buffer, Octal, Three-State, Inverting	HCTS240A
Buffer, Octal, Three-State, Inverting	HCTS540
Buffer, Octal, Three-State, Non-Inverting	HCTS244
COUNTERS	
Counter, 4-Bit, Binary, Ripple	HCTS93
Counter, 4-Bit, Sync, Binary	HCTS161A
Counter, 4-Bit, Sync, Binary, Presettable	HCTS163
Counter, Decade, Synchronous, BCD	HCTS160
Counter, Dual, 4-Stage, Binary	HCTS393
Counter, Dual, Decade, Ripple	HCTS390
Counter, Up-Down, Sync, 4-Bit, BCD	HCTS190
Counter, Up-Down, Sync, 4-Bit, Binary	HCTS193
Counter, Up-Down, Sync, 4-Bit, Binary, Presettable	HCTS191
DECODERS, ENCODERS	
Decoder/Demux, 2-to-4 Line, Inverting	HCTS139
Decoder/Demux, 3-to-8 Line, Inverting	HCTS138

DESCRIPTION	PART NUMBER
Encoder, 10-to-4 Line, Priority	HCTS147
FLIP-FLOPS	
Flip-Flop, Dual D Type, with Set and Reset	HCTS74
Flip-Flop, Dual, J-K, with Set and Reset, Negative Edge	HCTS112
Flip-Flop, Dual, J-K, with Set and Reset, Positive Edge	HCTS109
Flip-Flop, Octal, D Type, Three-State	HCTS374
Flip-Flop, Octal, D Type, Three-State	HCTS574
Flip-Flop, Octal, D Type, with Reset	HCTS273
GATES	
AND Gate, Dual, 4-Input	HCTS21
AND Gate, Triple, 3-Input	HCTS11
AND Gate, Quad, 2-Input	HCTS08
Exclusive-NOR Gate, Quad, 2-Input	HCTS7266
Exclusive-OR Gate, Quad, 2-Input	HCTS86
NAND Gate, 8-Input	HCTS30
NAND Gate, Dual, 4-Input	HCTS20
NAND Gate, Triple, 3-Input	HCTS10
NAND Gate, Quad, 2-Input	HCTS00
NAND Schmitt Trigger, Quad, 2-Input	HCTS132
NOR Gate, Dual, 4-Input	HCTS4002
NOR Gate, Triple, 3-Input	HCTS27
NOR Gate, Quad, 2-Input	HCTS02
OR Gate, Quad, 2-Input	HCTS32
LATCHES	
Latch, Dual, 2-Bit, Bistable, Transparent	HCTS75
Latch, Octal, Transparent, Three-State	HCTS373
MULTIPLEXERS	
Multiplexer, Dual, 4-Input	HCTS153
Multiplexer, Quad, 2-Input	HCTS157
REGISTERS	
Register, Shift, 8-Bit, Serial-In/Parallel-Out	HCTS164
Register, Shift, 8-Bit, Universal, Three-State	HCTS299

DESCRIPTION	PART NUMBER
SPECIAL FUNCTION	
Bus Tranceiver, Octal, Three-State	HCTS245
Bus Tranceiver/Register, Octal, Three-State	HCTS646
Comparator, 4-Bit, Magnitude	HCTS85
Full Adder, 4-Bit, Binary, with Carry	HCTS283
Inverter, Hex	HCTS04
Schmitt Trigger, Hex, Inverting	HCTS14
MEMORY	
PROMS	
PROM, 2K x 8 CMOS	HS-6617RH
PROM, 8K x 8, CMOS	HS-6664RH
RAMS	
SRAM, 1024 x 4	CMM5114A
SRAM, 4096 x 1	CMM5104
SRAM, 8K x 8 SOS	HS-65647RH
MICROPROCESSORS	
PROCESSORS	
8-Bit, 2MHz	HS-80C85RH
16-Bit, 8MHz	HS-80C86RH
PERIPHERALS	
Bus Transceiver, 8-Bit	HS-82C08RH
Clock Generator/Controller, 8MHz	HS-82C85RH
Decoder/Demultiplexer, 3 to 8 Line	HS-54C138RH
DMA Controller, 12.5MHz	HS-82C37ARH
Input/Output Port, 8-Bit	HS-82C12RH
Level Converter, CMOS/TTL, 8-Bit	HS-3374RH
Level Converter, with Bi-Directional Interface	GP511
Peripheral Interface, Prog, 8MHz	HS-82C55ARH
SRAM, 256 x 8, CMOS, CE High	HS-81C56RH
SRAM, 256 x 8, CMOS, CE Low	HS-81C55RH
Timer, Interval, Programmable 10MHz	HS-82C54RH
MICROCONTROLLERS	
16-Bit Microcontroller	HS-RTX2010RH

MOSFETs MEGARAD SERIES

$r_{DS(ON)}(\Omega)$	I_D	100V	200V	250V	500V
N-Channel TO-205AF					
0.18	8	FRL130, JANSR2N7272			
0.50	5		FRL230, JANSR2N7275		
0.70	4			FRL234, JANSR2N7278	
2.50	2				FRL430, JANSR2N7281
N-Channel TO-257AA					
0.145	17	FRS140, 2N7284			
0.195	12	FRS130, 2N7273			
0.255	12		FRS240, 2N7286		
0.415	9			FRS244, 2N7288	
0.515	7		FRS230, 2N7276		
0.715	5			FRS234, 2N7279	
1.42	5				FRS440, 2N7290
2.52	3				FRS430, 2N7282
N-Channel TO-254AA					
0.070	25	FRS150, JANSR2N7292			
0.115	23		FRS250, JANSR2N7294		
0.185	17			FRS254, JANSR2N7296	
0.615	9				FRS450, JANSR2N7298
N-Channel TO-258AA					
0.050	41	FRE160, 2N7300			
0.080	31		FRE260, 2N7302		
0.13	23			FRE264, 2N7304	
0.41	12				FRE460, 2N7306
N-Channel TO-204AA					
0.13	23	FRM140, 2N7283			
0.18	14	FRM130, 2N7271			
0.24	16		FRM240, 2N7285		
0.40	12			FRM244, 2N7287	
0.50	8		FRM230, 2N7274		
0.60	10				FRM450, 2N7297
0.70	7			FRM234, 2N7277	
1.40	6				FRM440, 2N7289
2.50	3				FRM430, 2N7280
N-Channel TO-204AE					
0.040	50	FRK160, 2N7299			
0.055	40	FRK150, 2N7291			

MOSFETs MEGARAD SERIES (Continued)

$r_{DS(ON)}(\Omega)$	I_D	100V	200V	250V	500V
0.070	46		FRK260, 2N7301		
0.10	27		FRK250, 2N7293		
0.12	34			FRK264, 2N7303	
0.17	20			FRK254, 2N7295	
0.40	17				FRK460, 2N7305
P-Channel TO-205AF					
0.55	5	FRL9130, 2N7308			
1.30	3		FRL9230, 2N7311		
P-Channel TO-257AA					
0.315	11	FRS9140, 2N7317			
0.565	6	FRS9130, 2N7309			
0.735	7		FRS9240, 2N7319		
1.32	4		FRS9230, 2N7312		
P-Channel TO-254AA					
0.14	23	FRF9150, 2N7323			
0.315	14		FRF9250, 2N7325		
P-Channel TO-258					
0.095	30	FRE9160, 2N7329			
0.21	19		FRE9260, 2N7331		
P-Channel TO-204AA					
0.30	11	FRM9140, 2N7316			
0.30	16		FRM9250, 2N7324		
0.55	6	FRM9130, 2N7307			
0.72	7		FRM9240, 2N7318		
1.30	4		FRM9230, 2N7310		
P-Channel TO-204AE					
0.085	40	FRK9160, 2N7328			
0.125	26	FRK9150, 2N7322			
0.20	26		FRK9260, 2N7330		

MOSFETs, SINGLE EVENT RATED SERIES

$r_{DS(ON)}(\Omega)$	I_D	60V	100V	200V	250V	500V
N-Channel TO-205AF						
0.180	9		FSL13A0			
0.23	8		FSL130, JANSR2N7395			
03.50	6			FSL23A0		

MOSFETs, SINGLE EVENT RATED SERIES (Continued)

$r_{DS(ON)}(\Omega)$	I_D	60V	100V	200V	250V	500V
0.46	5			FSL230, JANSR2N7396		
0.480	5				FSL23A4	
0.60	3.5		FSL110, JANSR2N7410			
0.61	4				FSL234, JANSR2N7397	
2.25 (Note)	1.5				FSL214	
2.50	2					FSL430, JANSR2N7398
N-Channel TO-257AA						
0.170	12		FSS13A0			
0.21	11		FSS130, JANSR2N7399			
0.330	9			FSS23A0		
0.44	8			FSS230, JANSR2N7400		
0.460	7				FSS23A4	
0.60	6				FSS234, JANSR2N7401	
2.70	3					FSS430, JANSR2N7402
N-Channel TO-254AA						
0.011	70	FSJ055, JANSR2N7430				
0.020	25	FSF055				
0.022	70		FSJ160			
0.050	44			FSJ260		
0.070	25		FSF150, JANSR2N7405			
0.080	33				FSJ264	
0.11	24			FSF250, JANSR2N7406		
0.17	18				FSF254, JANSR2N7407	
0.60	9					FSF450, JANSR2N7408
N-Channel SMD-1						
0.070 (Note)	25 (Note)		FSYA150, FSYB150			
0.10	27			FSYA250, FSYB250		
0.17 (Note)	18 (Note)				FSYA254, FSYB254	
0.60 (Note)	9 (Note)					FSYA450, FSYB450

MOSFETs, SINGLE EVENT RATED SERIES (Continued)

$r_{DS(ON)}(\Omega)$	I_D	60V	100V	200V	250V	500V
N-Channel SMD-2						
0.011 (Note)	70 (Note)	FSYC055, FSYD055				
0.020 (Note)	66 (Note)		FSYC160, FSYD160			
0.050 (Note)	40 (Note)			FSYC260, FSYD260		
0.075 (Note)	32 (Note)				FSYC264, FSYD264	
P-Channel TO-205AF						
0.30 (Note)	6.5 (Note)		FSL913A0			
0.80 (Note)	4.0 (Note)			FSL923A0		
0.68	5		FSL9130			
1.30	2.5		FSL9110, JANSR2N7411			
1.5	3			FSL9230		
P-Channel TO-257AA						
0.66	6		FSS9130			
1.60	4			FSS9230		
0.280	10		FSS913A0			
0.650	7			FSS923A0		
P-Channel TO-254AA						
0.030 (Note)	51 (Note)	FSJ9055				
0.050 (Note)	42 (Note)		FSJ9160			
0.12 (Note)	26 (Note)			FSJ9260		
0.14	22		FSF9150, JANSR2N7403			
0.29	15			FSF9250, JANSR2N7404		
P-Channel SMD-1						
0.14 (Note)	22 (Note)		FSYA9150, FSYB9150			
0.29 (Note)	15 (Note)			FSYA9250, FSYB9250		
P-Channel SMD-2						
0.030 (Note)	51 (Note)	FSYC9055, FSYD9055				
0.050 (Note)	42 (Note)		FSYC9160, FSYD9160			
0.12 (Note)	26 (Note)			FSYC9260, FSYD9260		

NOTE: Preliminary specification

HARRIS RAD HARD ICs CONVERTED TO QML SMDs

A HARRIS RAD HARD IC PRODUCT STANDARDIZATION PLAN HAS BEEN IMPLEMENTED

The following questions and answers have been prepared for your reference.

WHAT DOES THIS MEAN?

- ALL of the more than 300 Harris Rad Hard IC products have been converted to QML SMDs. (January 1, 1996, Note 1)
  - If we offered Classes B and S Flows for a device type, we now offer Classes Q and V under the SMD (Note 2).
  - If only Class S was offered, then only Class V is now offered under the SMD.
  - The parts are the same, having the same packages and specifications. Only the number will change.
- Harris will not accept any more Rad Hard IC Source Control Drawing (SCD) business.
  - Custom brand is offered, but only on the QML SMD flow.
  - Single lot Date Code is offered.
  - QCI on a customer lot is offered as an option, but it is a standard QCI and the custom brand option will be required to be ordered with the QCI option.

WHY HAVE WE DONE THIS?

- In order to stay competitive, we must reduce the complexity of how we do business.
  - Going to a single standard manufacturing flow per device type has reduced this complexity.
- In order to remain competitive we needed to lower our customers' total cost of procurement.
  - Lower MLQs.
  - Shorten lead times.
  - Even lower MLQs and shorter lead times available through distribution.
  - Customers do not need to maintain an SCD infrastructure.
  - DSCC maintains configuration control on the SMDs.
  - Incoming inspections can be reduced or eliminated because all devices are produced under SMD control.

WHAT HAS BEEN ACCOMPLISHED?

- DSCC has created more than 300 SMDs for all Harris Rad Hard ICs.
- Harris is a fully compliant QML supplier.
- Customers are encouraged to buy standard parts as represented by the SMD rather than their SCD.
- We are now reviewing all customer drawings against the QML SMD flow.

NOTE: The Harris Rad Hard Power MOSFET products are not included in this standardization plan.

ACRONYM DEFINITIONS

DSCC: Defense Supply Center Columbus. The Government entity administering the QML Program.

MLQ: Minimum Line Quantities. Also known as Minimum Order Quantity (MOQ).

QCI: Quality Conformance Inspection

QML: Qualified Manufacturer List

SCD: Source Control Drawing

SMD: Standard Microcircuit Drawing

NOTES:

1. Traditionally Class B is MIL-M-38510 Military Non-Rad-Hard, and Class S is Military Rad-Hard for Space applications.
2. Classes Q and V are the equivalent Class B and S Flows, respectively, for the new QML Specifications MIL-PRF-38535.

Rad Hard SMD Test Flow

TEST	MIL-STD-883 TEST METHOD	CLASS Q	CLASS V
Wafer Lot Acceptance (Note 1)	PM Electrical Samples (Note 2)	Yes	Yes
Nondestructive Bond Pull	2023 or Approved Alternate	-	Yes
Internal Visual	2010 SOS/SCD Compliant Grandfathered Material	Yes	Yes
Temperature Cycling	1010	Yes	Yes
Constant Acceleration	2001	Yes	Yes
PIND	2020	-	Yes
Serialization	In Accordance With Device Procurement Specifications	Yes	Yes
Radiographic Inspection	2012	-	Yes
Interim (Pre Burn-In) Electrical Parameters	In Accordance With Device Procurement Specifications	Yes	Yes
Burn-In Test (DC)	1015	Yes	Yes
Interim (Post Burn-In) Electrical Parameters	In Accordance With Device Procurement Specifications	Yes	Yes
Reverse Bias Burn-In (Dynamic)	1015	-	Yes
Interim (Post Burn-In) Electrical Parameters	In Accordance With Device Procurement Specifications	Yes	Yes
Percent Defective Allowable (PDA) Calculation	All Lots or as Required by Device Procurement Specification	Yes	Yes
Final Electrical Test	In Accordance With Device Procurement Specifications	Yes	Yes
Seal (Fine and Gross)	1014	Yes	Yes
External Visual	2009	Yes	Yes

NOTES:

1. Product that does not meet step coverage requirements per MIL-STD-883, Method 2018 will be evaluated for minimum metal thickness requirements using the following criteria:
   Current density of 2E5 A/CM2
   Electromigration rules for the applicable technology
   A minimum thickness of 2000Å for mechanical integrity
   The thickest metal requirement calculated to meet the appropriate metal thickness will be used as the acceptance criteria for step coverage.
2. Class V uses test method 5007 plus PM Electrical Samples, Class Q uses PM Electrical Samples only.

Military and Space Cross-Reference Part Number Listing Information

The cross-reference listing on the following pages, in Harris marketing/order entry part number sequence, contains all line items of the standard High-Reliability/Military (-55°C to 125°C temperature range) and Rad Hard products offered by Harris Semiconductor. The contents of this listing are described below.

Column 1. Compliant/Non-Compliant

C = Compliant

The Harris product in column two is fully compliant to the appropriate military specifications.

N = Non-Compliant

The Harris product in column two is non-compliant to appropriate military specifications, for some reason. The product is processed to "equivalent" flows and is tested and/or guaranteed for -55°C to 125°C temperature range operation.

These products normally do not automatically receive QCI Groups B, C, and/or D testing, and generic data may not be maintained.

Column 2. Harris Marketing/Order Entry Part Number

This entire list is in sequence by this number. All part numbers listed are Harris Semiconductor marketing and order entry part numbers assigned to sell a compliant or non-compliant military temperature range part. Occasionally a base/generic Harris part number is entered to cross-reference a QML-JAN or QML-DESC/SMD part number given in the next column.

The break-down of these marketing part numbers can be obtained by using the nomenclature guides located in the ordering information pages of this section.

Column 3. Reference Number

This number cross-references the Harris part number in Column 2 to another version/offering of this device type. The referenced number may, or may not be identical (electrical limits, testing, processing) to the Column 2 part number. However, a review of the specific data sheets and processing flows will allow necessary comparison.

QML-JAN and QML-DESC/SMD part numbers are crossed to Harris generic part numbers, and Harris part numbers are crossed to QML-JAN and QML-DESC/SMD part numbers. Also, non-compliant part numbers will be crossed to a compliant version, where one is available.

Column 4. Description

This column provides a very basic description of the part number given in Column 2.

Column 5. Data Sheet Reference

This column provides the data sheet file number for the marketing part number given in column two; also known as the document number. JAN, SMD and DESC data sheets must be obtained from DESC.

NOTE: Datasheets for parts referencing JM38510 or Standard Microcircuit Drawing (SMD) can be ordered through DESC.

See Section 2 for complete selection guide, page number reference, and file number listing.

PART NUMBER LISTING

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	24501BVA	HM1-6504	RAM, Synchronous, 4K x 1, JAN (JM38510)	-
C	24502BVA	HM1-6514	RAM, Synchronous, 4K x 1, JAN (JM38510)	-
C	29102BJA	HM1-6516	RAM, Synchronous, 2K x 8, JAN (JM38510)	-
C	29103BRA	HM1-65262	RAM, Asynchronous, 16K x 1, JAN (JM38510)	-
C	29104BJA	HM1-65162	RAM, Asynchronous, 2K x 8, JAN (JM38510)	-
C	29109BRA	HM1-65262B	RAM, Asynchronous, 16K x 1, JAN (JM38510)	-
C	29110BJA	HM1-65162B	RAM, Asynchronous, 2K x 8, JAN (JM38510)	-
C	29205BXA	HM1-65642B	RAM, Asynchronous, 8K x 8, JAN (JM38510)	-
C	2N6756TX	MIL-S-19500/542A	Power JANTX MOSFET 14.0A, 100V N-Channel TO-3	1586
C	2N6756TXV	MIL-S-19500/542A	Power JANTXV MOSFET 14.0A, 100V N-Channel	1586
C	2N6758TX	MIL-S-19500/542A	Power JANTX MOSFET 9.0A, 200V N-Channel	1587
C	2N6758TXV	MIL-S-19500/542A	Power JANTXV MOSFET 9.0A, 200V N-Channel	1587
C	2N6760TX	MIL-S-19500/542A	Power JANTX MOSFET 5A, 400V N-Channel	1588
C	2N6760TXV	MIL-S-19500/542A	Power JANTXV MOSFET 5A, 400V N-Channel	1588
C	2N6762TX	MIL-S-19500/542A	Power JANTX MOSFET 4A, 500V N-Channel	1589
C	2N6762TXV	MIL-S-19500/542A	Power JANTXV MOSFET 4A, 500V N-Channel	1589
C	2N6764TX	MIL-S-19500/543A	Power JANTX MOSFET 38A, 100V N-Channel	1590
C	2N6764TXV	MIL-S-19500/543A	Power JANTXV MOSFET 38A, 100V N-Channel	1590
C	2N6766TX	MIL-S-19500/543A	Power JANTX MOSFET 30A, 200V N -Channel	1591
C	2N6766TXV	MIL-S-19500/543A	Power JANTXV MOSFET 30A, 200V N-Channel	1591
C	2N6768TX	MIL-S-19500/543A	Power JANTX MOSFET 14A, 400V N-Channel	1898
C	2N6768TXV	MIL-S-19500/543A	Power JANTXV MOSFET 14A, 400V N-Channel	1898
C	2N6770TX	MIL-S-19500/543A	Power JANTX MOSFET 12A, 500V N-Channel	1899
C	2N6770TXV	MIL-S-19500/543A	Power JANTXV MOSFET 12A, 500V N-Channel	1899
C	2N6782TX	MIL-S-19500/556	Power JANTX MOSFET 3A, 100V N-Channel	1592
C	2N6782TXV	MIL-S-19500/556	Power JANTX V MOSFET 3A, 100V N-Channel	1592
C	2N6784TX	MIL-S-19500/556	Power JANTX MOSFET 25A, 200V N-Channel	1906
C	2N6784TXV	MIL-S-19500/556	Power JANTXV MOSFET 25A, 200V N-Channel	1906
C	2N6786TX	MIL-S-19500/556	Power JANTX MOSFET 15A, 400V N-Channel	2207
C	2N6786TXV	MIL-S-19500/556	Power JANTXV MOSFET 15A, 400V N-Channel	2207
C	2N6788TX	MIL-S-19500/555	Power JANTX MOSFET 6.0A, 100V N-Channel	1593
C	2N6788TXV	MIL-S-19500/555	Power JANTXV MOSFET 6.0A, 100V N-Channel	1593
C	2N6790TX	MIL-S-19500/555	Power JANTX MOSFET 3A, 200V N-Channel	1900
C	2N6790TXV	MIL-S-19500/555	Power JANTXV MOSFET 3A, 200V N-Channel	1900
C	2N6792TX	MIL-S-19500/555	Power JANTX MOSFET 2A, 400V N-Channel	1901
C	2N6792TXV	MIL-S-19500/555	Power JANTXV MOSFET 2A, 400V N-Channel	1901
C	2N6794TX	MIL-S-19500/555	Power JANTX MOSFET 1A, 500V N-Channel	1902
C	2N6794TXV	MIL-S-19500/555	Power JANTXV MOSFET 1A, 500V N-Channel	1902
C	2N6796TX	MIL-S-19500/557	Power JANTX MOSFET 8.0A, 100V N-Channel	1594
C	2N6796TXV	MIL-S-19500/557	Power JANTXV MOSFET 8.0A, 10V N-Channel	1594
C	2N6798TX	MIL-S-19500/557	Power JANTX MOSFET 5A, 200V N-Channel	1903
C	2N6798TXV	MIL-S-19500/557	Power JANTXV MOSFET 5A, 200V N-Channel	1903
C	2N6800TX	MIL-S-19500/557	Power JANTX MOSFET 3A, 400V N-Channel	1904
C	2N6800TXV	MIL-S-19500/557	Power JANTXV MOSFET 3A, 400V N-Channel	1904
C	2N6802TX	MIL-S-19500/557	Power JANTX MOSFET 2A, 500V N-Channel	1905
C	2N6802TXV	MIL-S-19500/557	Power JANTXV MOSFET 2.5A, 500V, N-Channel, TO-205AF	-
C	2N6849TX	MIL-S-19500/564	Power JANTX MOSFET 6A, 100V, P-Channel	2219
C	2N6849TXV	MIL-S-19500/564	Power JANTXV MOSFET 6A, 100V, P-Channel	2219
C	2N6851TX	MIL-S-19500/563	Power JANTX MOSFET 4A, 200V P-Channel	2218

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	2N6851TXV	MIL-S-19500/563	Power JANTX MOSFET 4A, 200V P-Channel	2218
C	2N6895TX	MIL-S-19500/565	Power JANTX MOSFET 16A, 100V P-Channel	1873
C	2N6895TXV	MIL-S-19500/565	Power JANTX MOSFET 16A, 100V P-Channel	1873
C	2N6896TX	MIL-S-19500/565	Power JANTX MOSFET 6A, 100V P-Channel	1874
C	2N6896TXV	MIL-S-19500/565	Power JANTXV MOSFET 6A, 100V P-Channel	1874
C	2N6897TX	MIL-S-19500/565	Power JANTX MOSFET 12A, 30W, 100W P-Channel	1875
C	2N6897TXV	MIL-S-19500/565	Power JANTXV MOSFET 12A, 100V P-Channel	1875
C	2N6898TX	MIL-S-19500/565	Power JANTX MOSFET 25A, 100V P-Channel	1876
C	2N6898TXV	MIL-S-19500/565	Power JANTXV MOSFET 25A, 100V P-Channel	1876
C	2N6901TX	MIL-S-19500/566	Power JANTX MOSFET Logic-Level FET 1.69A	1877
C	2N6901TXV	MIL-S-19500/566	Power JANTXV MOSFET Logic-Level FET 1.69A	1877
C	2N6902TX	MIL-S-19500/566	Power JANTX MOSFET Logic-Level FET 12A, 100 N-Channel	1878
C	2N6902TXV	MIL-S-19500/566	Power JANTXV MOSFET Logic-Level FET 12A, 100V N-Channel	1878
C	2N6903TX	MIL-S-19500/566	Power JANTX MOSFET Logic-Level FET 0.98A	1879
C	2N6903TXV	MIL-S-19500/566	Power JANTXV MOSFET Logic-Level FET 0.98A	1879
C	2N6904TX	MIL-S-19500/566	Power JANTX MOSFET Logic-Level FET 8A, 200V, N-Channel	1880
C	2N6904TXV	MIL-S-19500/566	Power JANTXV MOSFET Logic-Level FET 8A, 200V N-Channel	1880
	2N7119	89009-2N7119TX & TXV	See Ref P/N	-
	2N7120	89009-2N7120TX & TXV	See Ref P/N	-
	2N7121	89009-2N7121TX & TXV	See Ref P/N	-
	2N7122	89009-2N7122TX & TXV	See Ref P/N	-
	2N7123	89007-2N7123TX & TXV	See Ref P/N	-
	2N7124	89007-2N7124TX & TXV	See Ref P/N	-
	2N7125	89007-2N7125TX & TXV	See Ref P/N	-
	2N7126	89007-2N7126TX & TXV	See Ref P/N	-
C	2N7224TX	MIL-S-19500/592	Power MOSFET JANTX 100V, 34A N-Channel TO-254AA	-
C	2N7224TXV	MIL-S-19500/592	Power MOSFET JANTXV 100V, 34A N-Channel TO-254AA	-
C	2N7225TX	MIL-S-19500/592	Power MOSFET JANTX 200V, 27A N-Channel TO-254AA	-
C	2N7225TXV	MIL-S-19500/592	Power MOSFET JANTXV 200V, 27A N-Channel TO-254AA	-
C	2N7227TX	MIL-S-19500/592	Power MOSFET JANTX 400V, 14A N-Channel TO-254AA	-
C	2N7227TXV	MIL-S-19500/592	Power MOSFET JANTXV 400V, 14A N-Channel TO-254AA	-
C	2N7228TX	MIL-S-19500/592	Power MOSFET JANTX 500V, 12A N-Channel TO-254AA	-
C	2N7228TXV	MIL-S-19500/592	Power MOSFET JANTXV 500V, 12A N-Channel TO-254AA	-
	2N7241	89025-2N7241TX & TXV	See Ref P/N	-
	2N7242	89025-2N7242TX & TXV	See Ref P/N	-
	2N7243	89025-2N7243TX & TXV	See Ref P/N	-
	2N7244	89025-2N7244TX & TXV	See Ref P/N	-
	2N7271	FRM130	See Ref P/N	3217
	2N7272	FRL130	See Ref P/N	3218
	2N7273	FRS130	See Ref P/N	3219
	2N7274	FRM230	See Ref P/N	3249
	2N7275	FRL230	See Ref P/N	3223
	2N7276	FRS230	See Ref P/N	3224
	2N7277	FRM234	See Ref P/N	3250
	2N7278	FRL234	See Ref P/N	3229
	2N7279	FRS234	See Ref P/N	3251
	2N7280	FRM430	See Ref P/N	3252
	2N7281	FRL430	See Ref P/N	3234

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
	2N7282	FRS430	See Ref P/N	3253
	2N7283	FRM140	See Ref P/N	3220
	2N7284	FRS140	See Ref P/N	3254
	2N7285	FRM240	See Ref P/N	3225
	2N7286	FRS240	See Ref P/N	3255
	2N7287	FRM244	See Ref P/N	3230
	2N7288	FRS244	See Ref P/N	3256
	2N7289	FRM440	See Ref P/N	3235
	2N7290	FRS440	See Ref P/N	3257
	2N7291	FRK150	See Ref P/N	3221
	2N7292	FRF150	See Ref P/N. Also see SEGR Rad Hard P/N FSF150	3215
	2N7293	FRK250	See Ref P/N	3226
	2N7294	FRF250	See Ref P/N	3227
	2N7295	FRK254	See Ref P/N	3231
	2N7296	FRF254	See Ref P/N. Also see SEGR Rad Hard P/N FSF254	3232
	2N7297	FRM450	See Ref P/N	3236
	2N7298	FRF450	See Ref P/N. Also see SEGR Rad Hard P/N FSF450	3237
	2N7299	FRK160	See Ref P/N	3222
	2N7300	FRE160	See Ref P/N	3258
	2N7301	FRK260	See Ref P/N	3228
	2N7302	FRE260	See Ref P/N	3259
	2N7303	FRK264	See Ref P/N	3233
	2N7304	FRE264	See Ref P/N	3260
	2N7305	FRK460	See Ref P/N	3238
	2N7306	FRE460	See Ref P/N	3261
	2N7307	FRM9130	See Ref P/N	3262
	2N7308	FRL9130	See Ref P/N	3239
	2N7309	FRS9130	See Ref P/N	3240
	2N7310	FRM9230	See Ref P/N	3263
	2N7311	FRL9230	See Ref P/N	3245
	2N7312	FRS9230	See Ref P/N	3246
	2N7316	FRM9140	See Ref P/N	3241
	2N7317	FRS9140	See Ref P/N	3264
	2N7318	FRM9240	See Ref P/N	3242
	2N7319	FRS9240	See Ref P/N	3265
	2N7322	FRK9150	See Ref P/N	3266
	2N7323	FRF9150	See Ref P/N	3243
	2N7324	FRM9250	See Ref P/N	3267
	2N7325	FRF9250	See Ref P/N	3247
	2N7328	FRK9160	See Ref P/N	3244
	2N7329	FRE9160	See Ref P/N	3268
	2N7330	FRK9260	See Ref P/N	3248
	2N7331	FRE9260	See Ref P/N	3269
	2N7395	FSL130	See Ref P/N	4031
	2N7396	FSL230	See Ref P/N	4032
	2N7397	FSL234	See Ref P/N	4030
	2N7398	FSL430	See Ref P/N	4010
	2N7399	FSS130	See Ref P/N	4059
	2N7400	FSS230	See Ref P/N	4054
	2N7401	FSS234	See Ref P/N	4053

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
	2N7402	FSS430	See Ref P/N	4060
	2N7403	FSF9150	See Ref P/N	4089
	2N7404	FSF9250	See Ref P/N	4090
	2N7405	FSF150	See Ref P/N	3971
	2N7406	FSF250	See Ref P/N	4046
	2N7407	FSF254	See Ref P/N	3972
	2N7408	FSF450	See Ref P/N	3970
C	5962-85016013A	MR82C59A-5	SMD - Interrupt Controller-5MHz-28 Lead LCC	-
C	5962-8501601YA	MD82C59A-5	SMD - Interrupt Controller-5MHz-28 Lead CERDIP	-
C	5962-85016023A	MR82C59A	SMD - Interrupt Controller-8 MHz-28 Lead LCC	-
C	5962-8501602YA	MD82C59A	SMD - Interrupt Controller-8MHz-28 Lead CERDIP	-
C	5962-8512703XA	HI1-574AUD	SMD - 12-Bit A to D Controller	-
C	5962-8512703YA	HI4-574AUE	SMD - 12-Bit A to D Controller	-
C	5962-8512704XA	HI1-574ATD	SMD - 12-Bit A to D Controller	-
C	5962-8512704YA	HI4-574ATE	SMD - 12-Bit A to D Controller	-
C	5962-85131013A	HI4-0546/883	SMD - 16-Channel Over-Voltage Protected MUX	-
C	5962-8513101XA	HI1-0546/883	SMD - 16-Channel Over-Voltage Protected MUX	-
C	5962-85131023A	HI4-0547/883	SMD - 8-Channel Differential O-V Protected MUX	-
C	5962-8513102XA	HI1-0547/883	SMD - 8-Channel Differential O-V Protected MUX	-
C	5962-85131032A	HI4-0549/883	SMD - 4-Channel Differential O-V Protected MUX	-
C	5962-8513103EA	HI1-0549/883	SMD - 4-Channel Differential O-V Protected MUX	-
C	5962-85131073A	HI4-0506/883	SMD - 16-Channel Differential CMOS Analog MUX	-
C	5962-8513107XA	HI1-0506/883	SMD - 16-Channel Differential CMOS Analog MUX	-
C	5962-85131083A	HI4-0507/883	SMD - 8-Channel Differential CMOS Analog MUX	-
C	5962-8513108XA	HI1-0507/883	SMD - 8-Channel Differential CMOS Analog MUX	-
C	5962-85131092A	HI4-0509/883	SMD - 4-Channel Differential CMOS Analog MUX	-
C	5962-8513109EA	HI1-0509/883	SMD - 4-Channel Differential CMOS Analog MUX	-
C	5962-8515301CA	CD54HC73F3A	SMD - Dual Brand CD54HC73F3A	-
C	5962-8515401CA	CD54HC107F3A	SMD - Dual Brand CD54HC107F3A	-
C	5962-85528012A	MR82C89	SMD - Bus Arbiter, 8MHz, 20 Lead LCC	-
C	5962-8552801RA	MD82C89	SMD - Bus Arbiter, 8MHz, 20 Lead CERDIP	-
C	5962-8601601QA	MD80C88	SMD - 8/16-Bit CPU 5MHz, 40 Lead CERDIP	-
C	5962-8601601XA	MR80C88	SMD - 8/16-Bit CPU 5MHz, 44 Lead LCC	-
C	5962-8606101EA	CD54HC157F3A	SMD - Dual Brand CD54HC157F3A	-
C	5962-8606201RA	CD54HC563F3A	SMD - Dual Brand CD54HC563F3A	-
C	5962-8670101JA	CD54HCT154F3A	SMD - Dual Brand CD54HCT154F3A	-
C	5962-86716012A	HI4-0201HS/883	SMD - Hi-Speed Quad SPST CMOS Switch	-
C	5962-8671601EA	HI1-0201HS/883	SMD - Hi-Speed Quad SPST CMOS Switch	-
C	5962-8681201EA	CD54HC368F3A	SMD - Dual Brand CD54HC368F3A	-
C	5962-8681301RA	CD54HC533F3A	SMD - Dual Brand CD54HC533F3A	-
C	5962-8681401RA	CD54HC534F3A	SMD - Dual Brand CD54HC534F3A	-
C	5962-8681501RA	CD54HC564F3A	SMD - Dual Brand CD54HC564F3A	-
C	5962-8681701EA	CD54HC597F3A	SMD - Dual Brand CD54HC597F3A	-
C	5962-8681801RA	CD54HC688F3A	SMD - Dual Brand CD54HC688F3A	-
C	5962-8681901EA	CD54HC4049F3A	SMD - Dual Brand CD54HC4049F3A	-
C	5962-8682001EA	CD54HC4050F3A	SMD - Dual Brand CD54HC4050F3A	-
C	5962-8682101EA	CD54HC42F3A	SMD - Dual Brand CD54HC42F3A	-
C	5962-8682201JA	CD54HC154F3A	SMD - Dual Brand CD54HC154F3A	-
C	5962-8682301EA	CD54HC158F3A	SMD - Dual Brand CD54HC158F3A	-
C	5962-8682401EA	CD54HC160F3A	SMD - Dual Brand CD54HC160F3A	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	5962-8682501EA	CD54HC172F3A	SMD - Dual Brand CD54HC173F3A	-
C	5962-8682601EA	CD54HC194F3A	SMD - Dual Brand CD54HC194F3A	-
C	5962-8682701EA	CD54HC195F3A	SMD - Dual Brand CD54HC195F3A	-
C	5962-8682801EA	CD54HC366F3A	SMD - Dual Brand CD54HC366F3A	-
C	5962-8683101CA	CD54HCT00F3A	SMD - Dual Brand CD54HCT00F3A	-
C	5962-8684701EA	CD54HC123F3A	SMD - Dual Brand CD54HC123F3A	-
C	5962-8684801CA	CD54HC126F3A	SMD - Dual Brand CD54HC126F3A	-
C	5962-8685201CA	CD54HC32F3A	SMD - Dual Brand CD54HCT32F3A	-
C	5962-8685301CA	CD54HCT74F3A	SMD - Dual Brand CD54HCT74F3A	-
C	5962-8685401EA	CD54HCT161F3A	SMD - Dual Brand CD54HCT161F3A	-
C	5962-8685501EA	CD54HCT165F3A	SMD - Dual Brand CD54HCT165F3A	-
C	5962-8685601RA	CD54HCT573F3A	SMD - Dual Brand CD54HCT573F3A	-
C	5962-8685701RA	CD54HCT688F3A	SMD - Dual Brand CD54HCT688F3A	-
C	5962-86860012A	HA4-4902/883	SMD - Quad Comparator	-
C	5962-8686001EA	HA1-4902/883	SMD - Quad Comparator	-
C	5962-8686701RA	CD54HCT373F3A	SMD - Dual Brand CD54HCT373F3A	-
C	5962-86879013A	HS4-3182	SMD-ARINC Bus Interface Line Driver-LCC	-
C	5962-8687901EA	HS1-3182	SMD-ARINC Bus Interface Line Driver-16 Lead CERDIP	-
C	5962-8688001QA	HS1-3282	SMD-ARINC Bus Interface Circuit, 40 Lead CERDIP	-
C	5962-8688001XA	HS4-3282	SMD-ARINC Bus Interface Circuit, 44 Lead LCC	-
C	5962-8688301CA	CD54HCT08F3A	SMD - Dual Brand CD54HCT08F3A	-
C	5962-8688401EA	CD54HC238F3A	SMD - Dual Brand CD54HC238F3A	-
C	5962-8688501JA	CD54HC646F3A	SMD - Dual Brand CD54HC646F3A	-
C	5962-8688601EA	CD54HC4538F3A	SMD - Dual Brand CD54HC4538F3A	-
C	5962-8689001CA	CD54HCT14F3A	SMD - Dual Brand CD54HCT14F3A	-
C	5962-8689101EA	CD54HC191F3A	SMD - Dual Brand CD54HC191F3A	-
C	5962-87577012A	MR82C86H-5	SMD - Octal Inverting XCVR, 5MHz, 20 Lead LCC	-
C	5962-8757701RA	MD82C86H-5	SMD - Octal Inverting XCVR, 5MHz, 20 Lead CERDIP	-
C	5962-87577022A	MR82C87H-5	SMD - Octal Inverting XCVR 5MHz, 20 Lead LCC	-
C	5962-8757702RA	MD82C87H-5	SMD - Octal Inverting XCVR 5MHz, 20 Lead CERDIP	-
C	5962-8764701CA	CD54HC03F3A	SMD - Dual Brand CD54HC03F3A	-
C	5962-8765301JA	ICM7170MDG/883B	SMD - Real-Time Clock	-
C	5962-8766001G	ICL7667MTV/883B	SMD - Driver, Power MOSFET	-
C	5962-8766001PA	ICL7667MJA/883B	SMD - Driver, Power MOSFET	-
C	5962-87677012A	HA4-5330/883	SMD - High Speed Sample and Hold, 500ns	-
C	5962-8767701CA	HA1-5330/883	SMD - High Speed Sample and Hold, 500ns	-
C	5962-8768001EA	CD54HC4060F3A	SMD - Dual Brand CD54HC4060F3A	-
C	5962-8772101CA	CD54HC125F3A	SMD - Dual Brand CD54HC125F3A	-
C	5962-8772201CA	CD54HC4075F3A	SMD - Dual Brand CD54HC4075F3A	-
C	5962-8772401EA	CD54HC193F3A	SMD - Dual Brand CD54HC193F3A	-
C	5962-8772501RA	CD54HCT273F3A	SMD - Dual Brand CD54HCT273F3A	-
C	5962-8773301EA	CD54HC4511F3A	SMD - Dual Brand CD54HC4511F3A	-
C	5962-8775401EA	CD54HC4053F3A	SMD - Dual Brand CD54HC4053F3A	-
C	5962-87783012A	HA4-2400/883	SMD - 4-Channel Programmable Op Amp	-
C	5962-8778301EA	HA1-2400/883	SMD - 4-Channel Programmable Op Amp	-
C	5962-87784012A	HA4-5190/883	SMD - Fast Settling Op Amp 20 TER	-
C	5962-8778401CA	HA1-5190/883	SMD - Fast Settling Op Amp 14 Lead	-
C	5962-8778401X	HA2-5190/883	SMD - Fast Settling Op Amp 12 Lead	-
C	5962-8778501XA	HA2-2541/883	SMD - High Slew Rate Op Amp	-
C	5962-8778503CA	HA1-2841/883	SMD - Wide Band, Fast Settling Op Amp	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	5962-8778503PA	HA7-2841/883	SMD - Wide Band, Fast Settling Op Amp	-
C	5962-87787012A	HA4-2539/883	SMD - High Slew Rate Op Amp	-
C	5962-8778701CA	HA1-2539/883	SMD - High Slew Rate Op Amp	-
C	5962-8780501EA	CD54HC221F3A	SMD - Dual Brand CD54HC221F3A	-
C	5962-8780601RA	CD54HC299F3A	SMD - Dual Brand CD54HC299F3A	-
C	5962-8780701RA	CD54HC377F3A	SMD - Dual Brand CD54HC377F3A	-
C	5962-8780801EA	CD54HC192F3A	SMD - Dual Brand CD54HC192F3A	-
C	5962-8780901RA	CD54HC640F3A	SMD - Dual Brand CD54HC640F3A	-
C	5962-88502012A	HA4-5104/883	SMD - Quad High Performance Op Amp	-
C	5962-8850201CA	HA1-5104/883	SMD - Quad High Performance Op Amp	-
C	5962-8855601EA	CD54HC4052F3A	SMD - Dual Brand CD54HC4052F3A	-
C	5962-8857601CA	CD54HC21F3A	SMD - Dual Brand CD54HC21F3A	-
C	5962-8860601EA	CD54HC237F3A	SMD - Dual Brand CD54HC237F3A	-
C	5962-8862401JA	CD54HCT4059F3A	SMD - Dual Brand CD54HCT4059F3A	-
C	5962-8867101EA	CD54HCT191F3A	SMD - Dual Brand CD54HCT191F3A	-
C	5962-8867201EA	CD54HCT85F3A	SMD - Dual Brand CD54HCT85F3A	-
C	5962-88690013A	HM4-6642/883	SMD - 512 x 8 CMOS PROM LCC	-
C	5962-8869001JA	HM1-6642/883	SMD - 512 x 8 CMOS PROM DIP	-
C	5962-8869001LA	HM6-6642/883	SMD - 512 x 8 CMOS PROM Slim CERDIP	-
C	5962-88690023A	HM4-6642B/883	SMD - 512 x 8 CMOS PROM6642B LCC	-
C	5962-8869002JA	HM1-6642B/883	SMD - 512 x 8 CMOS PROM6642B DIP	-
C	5962-8869002LA	HM6-6642B/883	SMD - 512 x 8 CMOS PROM6642B Slim CERDIP	-
C	5962-88699013A	HI4-0516/883	SMD - 16-Channel/Differential 8-Channel CMOS MUX	-
C	5962-8869901XA	HI1-0516/883	SMD - 16-Channel/Differential 8-Channel CMOS MUX	-
C	5962-8875001EA	IH5352MJE/883B	SMD - Quad SPST RF/Video Switch	-
C	5962-8875701EA	CD54HCT4046AF3A	SMD - Dual Brand CD54HCT4046AF3A	-
C	5962-8875901EA	CD54HCT173F3A	SMD - Dual Brand CD54HCT173F3A	-
C	5962-8877201CA	ICL8038MJD/883B	SMD - Waveform Generator 250pp	-
C	5962-8943601MRA	CD54HCT299F3A	SMD - Dual Brand CD54HCT299F3A	-
C	5962-8944501JA	CD54HC4059F3A	SMD - Dual Brand CD54HC4059F3A	-
C	5962-8945801EA	CD54HCT4020F3A	SMD - Dual Brand CD54HCT4020F3A	-
C	5962-89502012A	HA4-2544/883	SMD - High Slew Rate Video Op Amp	-
C	5962-8950201G	HA2-2544/883	SMD - High Slew Rate Video Op Amp	-
C	5962-8950201PA	HA7-2544/883	SMD - High Slew Rate Video Op Amp	-
C	5962-8950303G	ICM7555MTV/883B	SMD - CMOS 555 General Purpose Timer	-
C	5962-8950304CA	ICM7556MJD/883B	SMD - CMOS Dual General Purpose Timer	-
C	5962-8954001JA	HM1-6617/883	SMD - 2K x 8 CMOS PROM DIP	-
C	5962-8954001LA	HM6-6617/883	SMD - 2K x 8 CMOS PROM Slim CERDIP	-
C	5962-8954001XA	HM4-6617/883	SMD - 2K x 8 CMOS PROM LCC	-
C	5962-8954002JA	HM1-6617B/883	SMD - 2K x 8 CMOS PROM DIP	-
C	5962-8954002LA	HM6-6617B/883	SMD - 2K x 8 CMOS PROM Slim CERDIP	-
C	5962-8954002XA	HM4-6617B/883	SMD - 2K x 8 CMOS PROM LCC	-
C	5962-89548012A	HA4-5102/883	SMD - Dual High Performance Op Amp	-
C	5962-8954801G	HA2-5102/883	SMD - Dual High Performance Op Amp	-
C	5962-8954801PA	HA7-5102/883	SMD - Dual High Performance Op Amp	-
C	5962-8960901EA	CD54HC4046AF3A	SMD - Dual Brand CD54HC4046AF3A	-
C	5962-89620012A	HA4-5020/883	SMD - Sample and Hold Op Amp	-
C	5962-8962001PA	HA7-5020/883	SMD - Sample and Hold Op Amp	-
C	5962-89627012A	HA4-5127/883	SMD - Precision Op Amp (OP27)	-
C	5962-8962701G	HA2-5127/883	SMD - Precision Op Amp (OP27)	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	5962-8962701PA	HA7-5127/883	SMD - Precision Op Amp (OP27)	-
C	5962-89627022A	HA4-5137/883	SMD - Precision Op Amp (OP27) Ultra Low Noise	-
C	5962-8962702G	HA2-5137/883	SMD - Precision Op Amp (OP27) Ultra Low Noise	-
C	5962-8962702PA	HA7-5137/883	SMD - Precision Op Amp (OP27) Ultra Low Noise	-
C	5962-89627032A	HA4-5147/883	SMD - Precision Op Amp LCC	-
C	5962-8962703G	HA2-5147/883	SMD - Precision Op Amp 8 Pin Can	-
C	5962-8962703PA	HA7-5147/883	SMD - Precision Op Amp 8 Lead CERDIP	-
C	5962-89631012A	HA4-5111/883	SMD - Low Noise Op Amp 20 TER LCC	-
C	5962-8963101G	HA2-5111/883	SMD - Low Noise Op Amp 8 Pin Can	-
C	5962-8963101PA	HA7-5111/883	SMD - Low Noise Op Amp 8 Lead CERDIP	-
C	5962-89632012A	HA4-5112/883	SMD - Dual Low Noise Op Amp 20 TER LCC	-
C	5962-8963201G	HA2-5112/883	SMD - Dual Low Noise Op Amp 8 Lead	-
C	5962-8963201PA	HA7-5112/883	SMD - Dual Low Noise Op Amp 8 Lead	-
C	5962-8963301X	HA2-5033/883	SMD - Video Buffer (TO-8) 12 Pin Can	-
C	5962-89634012A	HA4-5144/883	SMD - Quad Low Noise, High Performance Op Amp	-
C	5962-8963401CA	HA1-5114/883	SMD - Quad Low Noise Op Amp, CERDIP	-
C	5962-89635012A	HA4-5101/883	SMD - Low Noise Op Amp LCC	-
C	5962-8963501PA	HA7-5101/883	SMD - Low Noise Op Amp, CERDIP	-
C	5962-89636012A	HA4-5002/883	SMD - High Slew Rate Buffer	-
C	5962-8963601G	HA2-5002/883	SMD - High Slew Rate Buffer	-
C	5962-8963601PA	HA7-5002/883	SMD - High Slew Rate Buffer	-
C	5962-8964301X	HA2-2542/883	SMD - Wideband High Output Current Op Amp	-
C	5962-89648012A	HA2-2540/883	SMD - High Slew Rate Op Amp, 400V	-
C	5962-8964801CA	HA1-2540/883	SMD - High Slew Rate Op Amp, 400V	-
C	5962-89656022A	HA4-5142/883	SMD - Dual Ultra Low Power Op Amp	-
C	5962-8965602G	HA2-5142/883	SMD - Dual Ultra Low Power Op Amp	-
C	5962-8965602PA	HA7-5142/883	SMD - Dual Ultra Low Power Op Amp	-
C	5962-89656032A	HA4-5144/883	SMD - Quad Ultra Low Power Op Amp	-
C	5962-8965603CA	HA1-5144/883	SMD - Quad Ultra Low Power Op Amp	-
C	5962-8970001EA	CD54HCT123F3A	SMD - Dual Brand CD54HCT123F3A	-
C	5962-8970101EA	CD54HCT175F3A	SMD - Dual Brand CD54HCT175F3A	-
C	5962-8970201EA	CD54HCT112F3A	SMD - Dual Brand CD54HCT112F3A	-
C	5962-8970301CA	CD54HCT27F3A	SMD - Dual Brand CD54HCT27F3A	-
C	5962-8970401CA	CD54HCT164F3A	SMD - Dual Brand CD54HCT164F3A	-
C	5962-8970501EA	CD54HCT257F3A	SMD - Dual Brand CD54HCT257F3A	-
C	5962-8970701EA	CD54HCT257F3A	SMD - Dual Brand CD54HCT162F3A	-
C	5962-8970801EA	CD54HCT258F3A	SMD - Dual Brand CD54HCT258F3A	-
C	5962-8970901CA	CD54HCT11F3A	SMD - Dual Brand CD54HCT11F3A	-
C	5962-89721012A	HA4-2529/883	SMD - Op Amp, High Slew Rate	-
C	5962-8972101G	HA2-2529/883	SMD - Op Amp, High Slew Rate	-
C	5962-8972101PA	HA7-2529/883	SMD - Op Amp, High Slew Rate	-
C	5962-8974001RA	CD54HCT640F3A	SMD - Dual Brand CD54HCT640F3A	-
C	5962-8974201RA	CD54HCT574F3A	SMD - Dual Brand CD54HCT574F3A	-
C	5962-8974301EA	CD54HCT174F3A	SMD - Dual Brand CD54HCT174F3A	-
C	5962-8974501EA	CD54HCT238F3A	SMD - Dual Brand CD54HCT238F3A	-
C	5962-8974601CA	CD54HCT30F3A	SMD - Dual Brand CD54HCT30F3A	-
C	5962-8974701CA	CD54HCT04F3A	SMD - Dual Brand CD54HCT04F3A	-
C	5962-8975101CA	CD54HCT02F3A	SMD - Dual Brand CD54HCT02F3A	-
C	5962-8976301MEA	DG403AK/883	SMD - Dual Brand DG403AK Switch	-
C	5962-8976501EA	CD54HC283F3A	SMD - Dual Brand CD54HC283F3A	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	5962-8976901RA	CD54HCT377F3A	SMD - Dual Brand CD54HCT377F3A	-
C	5962-8977101EA	CD54HCT4060F3A	SMD - Dual Brand CD54HCT4060F3A	-
C	5962-8984201G	ICL8211MTY/883B	SMD - Voltage Ref/Indicator	-
C	5962-8984202G	ICL8212MTY/883B	SMD - Voltage Ref/Indicator	-
C	5962-8984301CA	CD54HCT10F3A	SMD - Dual Brand CD54HCT10F3A	-
C	5962-8984401CA	CD54HCT86F3A	SMD - Dual Brand CD54HCT86F3A	-
C	5962-8984501CA	CD54HCT132F3A	SMD - Dual Brand CD54HCT132F3A	-
C	5962-8984901RA	CD54HCT534F3A	SMD - Dual Brand CD54HCT534F3A	-
C	5962-8985201EA	CD54HCT259F3A	SMD - Dual Brand CD54HCT259F3A	-
C	5962-89880012A	HA4-2522/883	SMD - High Slew Rate Op Amp	-
C	5962-8988001G	HA2-2522/883	SMD - High Slew Rate Op Amp	-
C	5962-8988001PA	HA7-2522/883	SMD - High Slew Rate Op Amp	-
C	5962-8988002G	HA2-2520/883	SMD - High Slew Rate Op Amp	-
C	5962-8988002PA	HA7-2520/883	SMD - High Slew Rate Op Amp	-
C	5962-8989001CA	CD54HCT393F3A	SMD - Dual Brand CD54HCT393F3A	-
C	5962-8994601EA	CD54HC190F3A	SMD - Dual Brand CD54HC190F3A	-
C	5962-8994701MEA	CD54HCT4040F3A	SMD - Dual Brand CD54HCT4040F3A	-
C	5962-8995301EA	CD54HC4015F3A	SMD - Dual Brand CD54HC4015F3A	-
C	5962-8995401EA	CD54HC4520F3A	SMD - Dual Brand CD54HC4520F3A	-
C	5962-8996101EA	DG405AK/883	SMD - Dual Brand G405AK Switch	-
C	5962-8999001EA	CD54HC297F3A	SMD - Dual Brand CD54HC297F3A	-
C	5962-9050501MEA	CD54HCT153F3A	SMD - Dual Brand CD54HCT153F3A	-
C	5962-9052401MEA	CD54HCT251F3A	SMD - Dual Brand CD54HCT251F3A	-
C	5962-9052501MQA	HD1-6402R/883	SMD - UART, 2MHz, 40 Lead CERDIP	-
C	5962-9052502MQA	HD1-6402B/883	SMD - UART, 8MHz, 40 Lead CERDIP	-
C	5962-9054301MQA	MD82C37A-5	SMD - Programmable DMA Controller	-
C	5962-9054301MXA	MR82C37A-5	SMD - Programmable DMA Controller	-
C	5962-9054302MQA	MD32C37A	SMD - Programmable DMA Controller	-
C	5962-9054302MXA	MR82C37A	SMD - Programmable DMA Controller	-
C	5962-9054303MQA	MD82C37A-12	SMD - Programmable DMA Controller	-
C	5962-9054303MXA	MR82C37A-12	SMD - Programmable DMA Controller	-
C	5962-9054304MQA	MD82C237	SMD - Programmable DMA Controller	-
C	5962-9054304MXA	MR82C237	SMD - Programmable DMA Controller	-
C	5962-9054305MQA	MD82C237-12	SMD - Programmable DMA Controller	-
C	5962-9054305MXA	MR82C237-12	SMD - Programmable DMA Controller	-
C	5962-9055301EA	CD54HC40103F3A	SMD - Dual Brand CD54HC40103F3A	-
C	5962-9055701EA	CD14538BF3A	SMD - Dual Brand CD14538BF3A	-
C	5962-9056901EA	DG401AK/883	SMD - Dual Brand DG401AK Switch	-
C	5962-9057401EA	CD54HCT40102F3A	SMD - Dual Brand CD54HCT40102F3A	-
C	5962-9059701MEA	CD54HCT4017F3A	SMD - Dual Brand CD54HCT4017F3A	-
C	5962-9064001CA	CD4016BF3A	SMD - Dual Brand CD4016BF3A	-
C	5962-9065101MCA	CD54HCT126F3A	SMD - Dual Brand CD54HCT126F3A	-
C	5962-9065201MEA	CD54HCT151F3A	SMD - Dual Brand CD54HCT151F3A	-
C	5962-9065401MEA	CD54HCT4051F3A	SMD - Dual Brand CD54HCT4051F3A	-
C	5962-9067801MX	MG80C286-10/883	SMD - 16-Bit CPU 10MHz, 68 Lead PGA	-
C	5962-9067802MX	MG80C286-12/883	SMD - 16-Bit CPU 12MHz, 68 Lead PGA	-
C	5962-9070101MEA	CD54HCT109F3A	SMD - Dual Brand CD54HCT109F3A	-
C	5962-9070201MEA	CD54HCT157F3A	SMD - Dual Brand CD54HCT157F3A	-
C	5962-9070301MEA	CD54HCT158F3A	SMD - Dual Brand CD54HCT158F3A	-
C	5962-9070501MEA	CD54HCT160F3A	SMD - Dual Brand CD54HCT160F3A	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	5962-9070601MEA	CD54HCT367F3A	SMD - Dual Brand CD54HCT367F3A	-
C	5962-9073101MEA	DG411AK/883	SMD - Dual Brand DG411AK Switch	-
C	5962-9073102MEA	DG412AK/883	SMD - Dual Brand DG412AK Switch	-
C	5962-9073103MEA	DG413AK/883	SMD - Dual Brand DG413AK Switch	-
C	5962-9075801MEA	CD54HCT75F3A	SMD - Dual Brand CD54HCT75F3A	-
C	5962-9084801MEA	CD54HCT193F3A	SMD - Dual Brand CD54HCT193F3A	-
C	5962-9084901MCA	CD54HCT107F3A	SMD - Dual Brand CD54HCT107F3A	-
C	5962-9088801M2A	HD4-6409/883	SMD - CMOS Manchester Encoder Decoder	-
C	5962-9088801MRA	HD1-6409/883	SMD - CMOS Manchester Encoder Decoder	-
C	5962-9098401MEA	CD54HCT390F3A	SMD - Dual Brand CD54HCT390F3A	-
C	5962-9163001MEA	CD54HCT4052F3A	SMD - Dual Brand CD54HCT4052F3A	-
C	5962-9163401M2A	HA4-5221/883	SMD - Op Amp - High Performance Wide Band	-
C	5962-9163401MPA	HA7-5221/883	SMD - Op Amp - High Performance Wide Band	-
C	5962-9163402M2A	HA4-5222/883	SMD - Op Amp - Dual, High Performance Wide Band	-
C	5962-9163402MPA	HA7-5222/883	SMD - Op Amp - Dual, High Performance Wide Band	-
C	5962-9204101MEA	DG441AK/883	SMD - Dual Brand SMD DG441AK Switch	-
C	5962-9204102MEA	DG442AK/883	SMD - Dual Brand SMD DG442AK Switch	-
C	5962-9204201MEA	DG408AK/883	SMD - Dual Brand DG408AK MUX	-
C	5962-9204202MEA	DG409AK/883	SMD - Dual Brand DG409AK MUX	-
C	5962-9209701MX	HSP43891GM-20/883	SMD - FIR Filter, 8 Tap, 9-Bit, Dual Brand	-
C	5962-9209702MX	HSP43890GM-25/883	SMD - FIR Filter, 8 Tap, 9-Bit, Dual Brand	-
C	5962-9300701MX	HSP48908GM-20/883	SMD - 2 D Convolver, Dual Brand	-
C	5962-9300702MX	HSP48908GM-27/883	SMD - 2 S Convolver, Dual Brand	-
C	5962-9306301M2A	HA4-5340/883	SMD - Op Amp - High Speed Sample/Hold	-
C	5962-9306301MCA	HA1-5340/883	SMD - Op Amp - High Speed Sample/Hold	-
C	5962-9306302M2A	HA4-5320/883	SMD - Op Amp - Sample/Hold	-
C	5962-9306302MCA	HA1-5320/883	SMD - Op Amp - Sample/Hold	-
C	5962-9309501MEA	HA1-2444/883	SMD - Op Amp, 4-Channel, MUXED Output	-
C	5962-9325101M2A	HA4-2546/883	SMD - Multiplier, 2 Quad, Voltage Output	-
C	5962-9325101MEA	HA1-2546/883	SMD - Multiplier, 2 Quad, Voltage Output	-
C	5962-9455301M2A	HA4-5134/883	SMD - Op Amp - Quad Precision	-
C	5962-9455301MCA	HA1-5134/883	SMD - Op Amp - Quad Precision	-
C	5962-9456201M2A	HI4-0222/883	SMD - Dual SPST Video Switch	-
C	5962-9456201MCA	HI1-0222/883	SMD - Dual SPST Video Switch	-
C	5962-9457301MX	HSP48410GM-25/883	SMD - Histogrammer, Dual Brand	-
C	5962-9457302MX	HSP48410GM-33/883	SMD - Histogrammer, Dual Brand	-
C	5962-9467601MPA	HFA1100MJ/883	SMD - Current Feedback Amp, Ultra High Speed	-
C	5962-9467901MPA	HA7-2840/883	SMD - Op Amp, Wide Band, High Slew Rate	-
C	5962-9468201M2A	HFA1113ML/883	SMD - Buffer Amp, Ultra High Speed, Programmable Gain	-
C	5962-9468201MPA	HFA1113MJ/883	SMD - Buffer Amp, Ultra High Speed, Programmable Gain	-
C	5962-9468301MPA	HFA1110MJ/883	SMD - Buffer Amp, Closed Loop, 750MHz	-
C	5962-9468501MPA	HFA1120MJ/883	SMD - Current Feedback Amp	-
C	5962-9469401MPA	HA7-2842/883	SMD - Op Amp - Video	-
C	5962D9567001VCA	HS1-2700RH-Q	Rad Hard Low Power Op Amp, DIP	-
C	5962D9567001VGA	HS2-2700RH-Q	Rad Hard Low Power Op Amp, TO Can	-
C	5962D9567101VPA	HS7-2600RH-Q	Rad Hard Wideband Hi Impedance Op Amp, DIP	-
C	5962F9563101VEC	HS1-26CT32RH-Q	SMD - Rad Hard RS422 Transmitter, DIP	-
C	5962F9563101VXC	HS9-26CT32RH-Q	SMD - Rad Hard RS422 Receiver, Flatpack	-
C	5962F9563101QEC	HS1-26CT32RH-8	SMD - Rad Hard RS422 Receiver, DIP	-
C	5962F9563101QXC	HS9-26CT32RH-8	SMD - Rad Hard RS422 Receiver, Flatpack	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	5962F9563201VEC	HS1-26CT31RH-Q	SMD - Rad Hard RS422 Transmitter, DIP	-
C	5962F9563201VXC	HS9-26CT31RH-Q	SMD - Rad Hard RS422 Transmitter, Flatpack	-
C	5962F9563201QEC	HS1-26CT31RH-8	SMD - Rad Hard RS422 Transmitter, DIP	-
C	5962F9563201QXC	HS9-26CT31RH-8	SMD - Rad Hard RS422 Transmitter, Flatpack	-
C	5962H9215301QXC		SMD - Rad Hard, 32K x 8 SRAM	-
C	5962R9563701VCC	HCTS00DMSR	SMD - Rad Hard Quad 2 Input NAND Gate (TTL), DIP	-
C	5962R9563701VXC	HCTS00KMSR	SMD - Rad Hard Quad 2 Input NAND Gate (TTL), Flatpack	-
C	5962R9566301VCC	HCTS164DMSR	SMD - Rad Hard Serial-In/Parallel-Out Register (TTL), DIP	-
C	5962R9566301VXC	HCTS164KMSR	SMD - Rad Hard Serial-In/Parallel-Out Register (TTL), Flatpack	-
C	5962R9567001VCA	HS1-2700RH-Q	SMD - Rad Hard Low Power Op Amp, DIP	-
C	5962R9567001VGA	HS2-2700RH-Q	SMD - Rad Hard Low Power Op Amp, TO Can	-
C	5962R9567101VPA	HS7-2600RH-Q	SMD - Rad Hard Wideband Hi Impedance Op Amp, DIP	-
C	5962R9567901VCC	HCTS02DMSR	SMD - Rad Hard 2 Input NAND Gate (TTL), DIP	-
C	5962R9567901VXC	HCTS02KMSR	SMD - Rad Hard 2 Input NAND Gate (TTL), Flatpack	-
C	5962R9568001VCC	HCS08DMSR	SMD - Rad Hard Quad 2 Input AND Gate, DIP	-
C	5962R9568001VXC	HCS08KMSR	SMD - Rad Hard Quad 2 Input AND Gate, Flatpack	-
C	5962R9568101VCC	HCS14DMSR	SMD - Rad Hard Hex Inverting Schmitt Trigger, DIP	-
C	5962R9568101VXC	HCS14KMSR	SMD - Rad Hard Hex Inverting Schmitt Trigger, Flatpack	-
C	5962R9568201VCC	HCS02DMSR	SMD - Rad Hard 2 Input NAND Gate, DIP	-
C	5962R9568201VXC	HCS02KMSR	SMD - Rad Hard 2 Input NAND Gate, Flatpack	-
C	5962R9568301VCC	HCTS08DMSR	SMD - Rad Hard Quad 2 Input AND Gate (TTL), DIP	-
C	5962R9568301VXC	HCTS08KMSR	SMD - Rad Hard Quad 2 Input AND Gate (TTL), Flatpack	-
C	5962R9571901VCC	HCTS14DMSR	SMD - Rad Hard Hex Inverting Schmitt Trigger (TTL), DIP	-
C	5962R9571901VXC	HCTS14KMSR	SMD - Rad Hard Hex Inverting Schmitt Trigger (TTL), Flatpack	-
C	5962R9572001VCC	HCS11DMSR	SMD - Rad Hard Triple 3 Input AND Gate, DIP	-
C	5962R9572001VXC	HCS11KMSR	SMD - Rad Hard Triple 3 Input AND Gate, Flatpack	-
C	5962R9572101VCC	HCTS11DMSR	SMD - Rad Hard Triple 3 Input AND Gate (TTL), DIP	-
C	5962R9572101VXC	HCTS11KMSR	SMD - Rad Hard Triple 3 Input AND Gate (TTL), Flatpack	-
C	5962R9572401VCC	HCS00DMSR	SMD - Rad Hard Quad 2 Input NAND Gate, DIP	-
C	5962R9572401VXC	HCS00KMSR	SMD - Rad Hard Quad 2 Input NAND Gate, Flatpack	-
C	5962R9572501VCC	HCS04DMSR	SMD - Rad Hard Hex Inverter, DIP	-
C	5962R9572501VXC	HCS04KMSR	SMD - Rad Hard Hex Inverter, Flatpack	-
C	5962R9573101VCC	HCS244DMSR	SMD - Rad Hard Octal Buffer/Line Drive, Three-State, DIP	-
C	5962R9573101VXC	HCS244KMSR	SMD - Rad Hard Octal Buffer/Line Drive, Three-State, Flatpack	-
C	5962R9573201VCC	HCTS04DMSR	SMD - Rad Hard Hex Inverter (TTL), DIP	-
C	5962R9573201VXC	HCTS04KMSR	SMD - Rad Hard Hex Inverter (TTL), Flatpack	-
C	5962R9573301VCC	HCTS20DMSR	SMD - Rad Hard Dual 4 Input NAND Gate (TTL), DIP	-
C	5962R9573301VXC	HCTS20KMSR	SMD - Rad Hard Dual 4 Input NAND Gate (TTL), Flatpack	-
C	5962R9573401VCC	HCTS27DMSR	SMD - Rad Hard Triple 3 Input NOR Gate (TTL), DIP	-
C	5962R9573401VXC	HCTS27KMSR	SMD - Rad Hard Triple 3 Input NOR Gate (TTL), Flatpack	-
C	5962R9573501VCC	HCTS30DMSR	SMD - Rad Hard 8 Input NAND Gate (TTL), DIP	-
C	5962R9573501VXC	HCTS30KMSR	SMD - Rad Hard 8 Input NAND Gate (TTL), Flatpack	-
C	5962R9573601VCC	HCTS32DMSR	SMD - Rad Hard Quad 2 Input NAND Gate (TTL), DIP	-
C	5962R9573601VXC	HCTS32KMSR	SMD - Rad Hard Quad 2 Input NAND Gate (TTL), Flatpack	-
C	5962R9573901VCC	HCTS132DMSR	SMD - Rad Hard Quad 2 Input NAND Gate - Schmitt Trigger (TTL), DIP	-
C	5962R9573901VXC	HCTS132KMSR	SMD - Rad Hard Quad 2 Input NAND Gate - Schmitt Trigger (TTL), Flatpack	-
C	5962R9575201VCC	HCTS7266DMSR	SMD - Rad Hard Quad 2 Input Exclusive NOR Gate (TTL), DIP	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	5962R9575201VXC	HCTS7266KMSR	SMD - Rad Hard Quad 2 Input Exclusive NOR Gate (TTL), Flatpack	-
C	5962R9576301VCC	HCTS74DMSR	SMD - Rad Hard Dual-D Flip-Flop w/Dual Reset (TTL), DIP	-
C	5962R9576301VXC	HCTS74KMSR	SMD - Rad Hard Dual-D Flip-Flop w/Dual Reset (TTL), Flatpack	-
C	5962R9576501VCC	HCTS10DMSR	SMD - Rad Hard Triple 3-Input NAND Gate (TTL), DIP	-
C	5962R9576501VXC	HCTS10KMSR	SMD - Rad Hard Triple 3-Input NAND Gate (TTL), Flatpack	-
C	5962R9576601VCC	HCTS21DMSR	SMD - Rad Hard Dual 4 Input AND Gate (TTL), DIP	-
C	5962R9576601VXC	HCTS21KMSR	SMD - Rad Hard Dual 4 Input AND Gate (TTL), Flatpack	-
C	5962R9577701VCC	HCS10DMSR	SMD - Rad Hard Triple 3 Input NAND Gate, DIP	-
C	5962R9577701VXC	HCS10KMSR	SMD - Rad Hard Triple 3 Input NAND Gate, Flatpack	-
C	5962R9577801VCC	HCS20DMSR	SMD - Rad Hard Dual 4 Input NAND Gate, DIP	-
C	5962R9577801VXC	HCS20KMSR	SMD - Rad Hard Dual 4 Input NAND Gate, Flatpack	-
C	5962R9577901VCC	HCS21DMSR	SMD - Rad Hard Dual 4 Input AND Gate, DIP	-
C	5962R9577901VXC	HCS21KMSR	SMD - Rad Hard Dual 4 Input AND Gate, Flatpack	-
C	5962R9578001VCC	HCS27DMSR	SMD - Rad Hard Triple 3 Input NOR Gate, DIP	-
C	5962R9578001VXC	HCS27KMSR	SMD - Rad Hard Triple 3 Input NOR Gate, Flatpack	-
C	5962R9578101VCC	HCS32DMSR	SMD - Rad Hard Quad 2 Input NAND Gate, DIP	-
C	5962R9578101VXC	HCS32KMSR	SMD - Rad Hard Quad 2 Input NAND Gate, Flatpack	-
C	5962R9578301VCC	HCS86DMSR	SMD - Rad Hard Quad 2 Input Exclusive OR Gate, DIP	-
C	5962R9578301VXC	HCS86KMSR	SMD - Rad Hard Quad 2 Input Exclusive OR Gate, Flatpack	-
C	5962R9581401VCC	HCTS86DMSR	SMD - Rad Hard Quad 2 Input Exclusive OR Gate (TTL), DIP	-
C	5962R9581401VXC	HCTS86KMSR	SMD - Rad Hard Quad 2 Input Exclusive OR Gate (TTL), Flatpack	-
C	7702002EA	CD4502BF3A	SMD - Dual Brand CD4502BF3A	-
C	7702301EA	CD4520BF3A	SMD - Dual Brand CD4520BF3A	-
C	7702402CA	CD4081BF3A	SMD - Dual Brand CD4081BF3A	-
C	7702501EA	CD4094BF3A	SMD - Dual Brand CD4094BF3A	-
C	7703201JA	CD4515BF3A	SMD - Dual Brand CD4515BF3A	-
C	7703702EA	CD4585BF3A	SMD - Dual Brand CD4585BF3A	-
C	7704402CA	CD4078BF3A	SMD - Dual Brand CD4078BF3A	-
C	7704403CA	CD4002BF3A	SMD - Dual Brand CD4002BF3A	-
C	7704602CA	CD4093BF3A	SMD - Dual Brand CD4093BF3A	-
C	7704701EA	CD4555BF3A	SMD - Dual Brand CD4555BF3A	-
C	7704801EA	CD4556BF3A	SMD - Dual Brand CD4556BF3A	-
C	7705102CA	CD4073BF3A	SMD - Dual-Brand CD4073BF3A	-
C	77052012A	HI4-0508	SMD - 8-Channel CMOS Analog MUX	-
C	7705201E	HI1-0508	SMD - 8-Channel CMOS Analog MUX	-
C	77052022A	HI4-0548/883	SMD - 8-Channel Over-Voltage Protected	-
C	7705202EA	HI1-0548/883	SMD - 8-Channel Over-Voltage Protected	-
C	7705301EA	DG201AAK/883B	SMD - Quad SPST CMOS Analog Switch	-
C	77053022A	HI4-0201/883	SMD - Quad SPST CMOS Analog Switch	-
C	7705302EA	HI1-0201/883	SMD - Quad SPST CMOS Analog Switch	-
C	7705902CA	CD4082BF3A	SMD - Dual Brand CD4082BF3A	-
C	7706002CA	CD4072BF3A	SMD - Dual Brand CD4072BF3A	-
C	78003022A	HA4-2640/883	SMD - High Voltage Op Amp(\xb1 40V, USEC)	-
C	7800302G	HA7-2640/883	SMD - High Voltage Op Amp(\xb1 40V, USEC)	-
C	7800302PA	HA2-2640/883	SMD - High Voltage Op Amp(\xb1 40V, USEC)	-
C	78029013A	HD4-15530	SMD - Manchester Encoder/Decoder, 28 Lead LCC	-
C	7802901JA	HD1-15530	SMD - Manchester Encoder/Decoder, 24 Lead CERDIP	-
C	7901502EA	CD4052BF3A	SMD - Dual Brand CD4052BF3A	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	80016012A	HA4-2420/883	SMD - Sample/Hold Amp, LCC	-
C	8001601CA	HA1-2420/883	SMD - Sample/Hold Amp, CERDIP	-
C	8100604EA	IH5043MJE/883B	SMD - Dual SPDT CMOS Analog Switch	-
C	8100609EA/INT	IH5140MJE/883B	SMD - SPST CMOS Analog Switch	-
C	8100609EA/MLB	HI1-5040/883	SMD - SPST CMOS Analog Switch	-
C	8100610EA/INT	IH5141MJE/883B	SMD - Dual SPST CMOS Analog Switch	-
C	8100610EA/MLB	HI1-5041/883	SMD - Dual SPST CMOS Analog Switch	-
C	8100611EA/INT	IH5142MJE/883B	SMD - SPDT CMOS Analog Switch	-
C	8100611EA/MLB	HI1-5042/883	SMD - SPDT CMOS Analog Switch	-
C	81006122A	HI4-5043/883	SMD - Dual SPDT CMOS Analog Switch	-
C	8100612EA/INT	IH5143MJE/883	SMD - Dual SPDT CMOS Analog Switch	-
C	8100612EA/MLB	HI1-5043/883	SMD - Dual SPDT CMOS Analog Switch	-
C	8100613EA/INT	IH5144MJE/883B	SMD - DPST CMOS Analog Switch	-
C	8100613EA/MLB	HI1-5044/883	SMD - DPST CMOS Analog Switch	-
C	81006142A	HI4-5045/883	SMD - Dual SPDT CMOS Analog Switch	-
C	8100614EA/INT	IH5145MJE/883B	SMD - Dual DPST CMOS Analog Switch	-
C	8100614EA/MLB	HI1-5045/883	SMD - Dual DPST CMOS Analog Switch	-
C	8100615EA/MLB	HI1-5046/883	SMD - DPDT CMOS Analog Switch	-
C	8100616EA/MLB	HI1-5047/883	SMD - 4PST CMOS Analog Switch	-
C	8100617EA/MLB	HI1-5046A/883	SMD - DPDT CMOS Analog Switch	-
C	8100618EA/MLB	HI1-5047A/883	SMD - 4PST CMOS Analog Switch	-
C	8100619EA/MLB	HI1-5048/883	SMD - Dual SPST CMOS Analog Switch	-
C	81006202A	HI4-5049/883	SMD - Dual DPST CMOS Analog Switch	-
C	8100620EA/MLB	HI1-5049/883	SMD - Dual DPST CMOS Analog Switch	-
C	8100621EA/MLB	HI1-5050/883	SMD - SPDT CMOS Analog Switch	-
C	81006222A	HI4-5051/883	SMD - Dual SPDT CMOS Analog Switch	-
C	8100622EA/INT	IH5151MJE/883B	SMD - Dual SPDT CMOS Analog Switch	-
C	8100622EA/MLB	HI1-5051/883	SMD - Dual SPDT CMOS Analog Switch	-
C	8101602EA	CD4029BF3A	SMD - Dual Brand CD4029BF3A	-
C	8101701EA	CD4035BF3A	SMD - Dual Brand CD4035BF3A	-
C	8101801EA	CD4053BF3A	SMD - Dual Brand CD4053BF3A	-
C	8102001CA	CD4047BF3A	SMD - Dual Brand CD4047BF3A	-
C	8102401VA	HM1-6504S	SMD - 4096 x 1 RAM DIP Package	-
C	8102402VA	HM4-6504	SMD - 4096 x 1 RAM LCC Package	-
C	8102403VA	HM1-6504B/883	SMD - 4096 x 1 RAM DIP Package	-
C	8102404VA	HM4-6504B	SMD - 4096 x 1 RAM LCC Package	-
C	8102405VA	HM1-6504	SMD - 4096 x 1 RAM DIP Package	-
C	8102406VA	HM1-6514/883	SMD - 1024 x 4 RAM DIP Package	-
C	8403601JA	HM1-6516/883	SMD - 2048 x 8 RAM DIP Package	-
C	8403601ZA	HM4-6516	SMD - 2048 x 8 RAM LCC Package	-
C	8403602JA	HM1-65162/883	SMD - 2048 x 8 RAM DIP Package	-
C	8403602ZA	HM4-65162/883	SMD - 2048 x 8 RAM LCC Package	-
C	8403603JA	HM1-65162C/883	SMD - 2048 x 8 RAM DIP Package	-
C	8403603ZA	HM4-65162	SMD - 2048 x 8 RAM LCC Package	-
C	8403606JA	HM1-65162B/883	SMD - 2048 x 8 RAM DIP Package	-
C	8403606ZA	HM4-65162B/883	SMD - 2048 x 8 RAM LCC Package	-
C	8403607JA	HM1-6516B/883	SMD - 2048 x 8 RAM DIP Package	-
C	8403607ZA	HM4-6516B/883	SMD - 2048 x 8 RAM LCC Package	-
C	8403701CA	CD54HC00F3A	SMD - Dual Brand CD54HC00F3A	-
C	8403801CA	CD54HC10F3A	SMD - Dual Brand CD54HC10F3A	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	8403901CA	CD54HC20F3A	SMD - Dual Brand CD54HC20F3A	-
C	8404001CA	CD54HC30F3A	SMD - Dual Brand CD54HC30F3A	-
C	8404101CA	CD54HC02F3A	SMD - Dual Brand CD54HC02F3A	-
C	8404201CA	CD54HC27F3A	SMD - Dual Brand CD54HC27F3A	-
C	8404302CA	CD54HC7266F3A	SMD - Dual Brand CD54HC7266F3A	-
C	8404401CA	CD54HC4002F3A	SMD - Dual Brand CD54HC4002F3A	-
C	8404501CA	CD54HC32F3A	SMD - Dual Brand CD54HC32F3A	-
C	8404601CA	CD54HC86F3A	SMD - Dual Brand CD54HC86F3A	-
C	8404701CA	CD54HC08F3A	SMD - Dual Brand CD54HC08F3A	-
C	8404801CA	CD54HC11F3A	SMD - Dual Brand CD54HC11F3A	-
C	8405201QA	MD80C86	SMD - 16-Bit CPU, 5MHz, 40 Lead CERDIP	-
C	8405201XA	MR80C86	SMD - 16-Bit CPU, 5MHz, 44 Lead LCC	-
C	8405202QA	MD80C86-2	SMD - 16-Bit CPU, 8MHz, 40 Lead CERDIP	-
C	8405202XA	MR80C86-2	SMD - 16-Bit CPU, 8MHz, 44 Lead LCC	-
C	8405601CA	CD54HC74F3A	SMD - Dual Brand CD54HC74F3A	-
C	8406201EA	CD54HC138F3A	SMD - Dual Brand CD54HC138F3A	-
C	8406401EA	CD54HC147F3A	SMD - Dual Brand CD54HC147F3A	-
C	84065013A	MR82C54	SMD - Programmable Interval Timer, 8MHz, 28 Lead LCC	-
C	8406501JA	MD82C54	SMD - Programmable Interval Timer, 8MHz, 24 Lead CERDIP	-
C	84065023A	MR82C54-5	SMD - Programmable Interval Timer, 12MHz, 28 Lead LCC	-
C	8406502JA	MD82C54-5	SMD - Programmable Interval Timer, 12MHz, 24 Lead CERDIP	-
C	8406601QA	MD82C55A-5	SMD - Programmable Peripheral, 5MHz, 40 Lead CERDIP	-
C	8406601XA	MR82C55A-5	SMD - Programmable Peripheral, 5MHz, 44 Lead LCC	-
C	8406602QA	MD82C55A	SMD - Programmable Peripheral, 8MHz, 40 Lead CERDIP	-
C	8406602XA	MR82C55A	SMD - Programmable Peripheral, 8MHz, 44 Lead LCC	-
C	84067012A	MR82C82	SMD - Octal Latch Bus Driver, 20 Lead LCC	-
C	8406701RA	MD82C82	SMD - Octal Latch Bus Driver, 20 Lead CERDIP	-
C	84067022A	MR82C83H	SMD - Inverting Octal Latch Driver, 20 Lead LCC	-
C	8406702RA	MD82C83H	SMD - Inverting Octal Latch Driver, 20 Lead CERDIP	-
C	84068012A	MR82C84A	SMD - Clock Generator, 8MHz, 20 Lead LCC	-
C	8406801VA	MD82C84A	SMD - Clock Generator, 8MHz, 20 Lead CERDIP	-
C	84069012A	MR82C88	SMD - Bus Controller, 8MHz, 20 Lead LCC	-
C	8406901RA	MD82C88	SMD - Bus Controller, 8MHz, 20 Lead CERDIP	-
C	8407001EA	CD54HC75F3A	SMD - Dual Brand CD54HC75F3A	-
C	8407101RA	CD54HC374F3A	SMD - Dual Brand CD54HC374F3A	-
C	8407201RA	CD54HC373F3A	SMD - Dual Brand CD54HC373F3A	-
C	8407301EA	CD54HC174F3A	SMD - Dual Brand CD54HC174F3A	-
C	8407401RA	CD54HC240F3A	SMD - Dual Brand CD54HC240F3A	-
C	8407501EA	CD54HC161F3A	SMD - Dual Brand CD54HC161F3A	-
C	8408501RA	CD54HC245F3A	SMD - Dual Brand CD54HC245F3A	-
C	8408801EA	CD54HC112F3A	SMD - Dual Brand CD54HC112F3A	-
C	8408901EA	CD54HC175F3A	SMD - Dual Brand CD54HC175F3A	-
C	8409001CA	CD54HC243F3A	SMD - Dual Brand CD54HC243F3A	-
C	8409101CA	CD54HC14F3A	SMD - Dual Brand CD54HC14F3A	-
C	8409201EA	CD54HC139F3A	SMD - Dual Brand CD54HC139F3A	-
C	8409301EA	CD54HC153F3A	SMD - Dual Brand CD54HC153F3A	-
C	8409401EA	CD54HC162F3A	SMD - Dual Brand CD54HC162F3A	-
C	8409501EA	CD54HC165F3A	SMD - Dual Brand CD54HC165F3A	-
C	8409601RA	CD54HC244F3A	SMD - Dual Brand CD54HC244F3A	-
C	8409801CA	CD54HC04F3A	SMD - Dual Brand CD54HC04F3A	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	8409901RA	CD54HC273F3A	SMD - Dual Brand CD54HC273F3A	-
C	8410001CA	CD54HC393F3A	SMD - Dual Brand CD54HC393F3A	-
C	8412801EA	CD54HC151F3A	SMD - Dual Brand CD54HC151F3A	-
C	8413201RA	HM1-65262/883	SMD - 16384 x 1 RAM DIP Package	-
C	8413201YA	HM4-65262/883	SMD - 16384 x 1 RAM LCC Package	-
C	8413203RA	HM1-65262B	SMD - 16384 x 1 RAM DIP Package	-
C	8413203YA	HM4-65262B/883	SMD - 16384 x 1 RAM LCC Package	-
C	8415001EA	CD54HC109F3A	SMD - Dual Brand CD54HC109F3A	-
C	8416201CA	CD54HC164F3A	SMD - Dual Brand CD54HC164F3A	-
C	8500101EA	CD54HC365F3A	SMD - Dual Brand CD54HC365F3A	-
C	8500201EA	CD54HC367F3A	SMD - Dual Brand CD54HC367F3A	-
C	8500301EA	CD54HC4020F3A	SMD - Dual Brand CD54HC4020F3A	-
C	8500401EA	CD54HC4040F3A	SMD - Dual Brand CD54HC4040F3A	-
C	85015013A	MR82C52	SMD - Serial Comm I/F-28 Lead LCC	-
C	8501501XA	MD82C52	SMD - Serial Comm I/F-20 Lead CERDIP	-
C	8512401EA	CD54HC251F3A	SMD - Dual Brand CD54HC257F3A	-
C	8512501EA	CD54HC251F3A	SMD - Dual Brand CD54HC251F3A	-
C	8512801RA	CD54HC573F3A	SMD - Dual Brand CD54HC573F3A	-
C	8513001RA	CD54HCT244F3A	SMD - Dual Brand CD54HCT244F3A	-
C	8550401EA	CD54HCT138F3A	SMD - Dual Brand CD54HCT138F3A	-
C	8550501RA	CD54HCT240F3A	SMD - Dual Brand CD54HCT240F3A	-
C	8550601RA	CD54HCT245F3A	SMD - Dual Brand CD54HCT245F3A	-
C	8550701RA	CD54HCT374F3A	SMD - Dual Brand CD54HCT374F3A	-
C	8551901EA	CD54HC259F3A	SMD - Dual Brand CD54HC259F3A	-
C	8601001CA	CD54HCU04F3A	SMD - Dual Brand CD54HCU04F3A	-
C	8601101EA	CD54HC4017F3A	SMD - Dual Brand CD54HC4017F3A	-
C	8601201CA	CD54HC4024F3A	SMD - Dual Brand CD54HC4024F3A	-
C	8601301EA	CD54HC85F3A	SMD - Dual Brand CD54HC85F3A	-
C	8607601EA	CD54HC163F3A	SMD - Dual Brand CD54HC163F3A	-
C	8607701CA	CD54HC280F3A	SMD - Dual Brand CD54HC280F3A	-
C	87063-001	V22ZA05	DESC MOV 22V	-
C	87063-002	V22ZA1	DESC MOV 22V	-
C	87063-003	V22ZA2	DESC MOV 22V	-
C	87063-004	V22ZA3	DESC MOV 22V	-
C	87063-005	V24ZA50	DESC MOV 24V	-
C	87063-006	V27ZA05	DESC MOV 27V	-
C	87063-007	V27ZA1	DESC MOV 27V	-
C	87063-008	V27ZA2	DESC MOV 27V	-
C	87063-009	V27ZA4	DESC MOV 27V	-
C	87063-010	V27ZA60	DESC MOV 27V	-
C	87063-011	V33ZA05	DESC MOV 33V	-
C	87063-012	V33ZA1	DESC MOV 33V	-
C	87063-013	V33ZA2	DESC MOV 33V	-
C	87063-014	V33ZA5	DESC MOV 33V	-
C	87063-015	V33ZA70	DESC MOV 33V	-
C	87063-016	V36ZA80	DESC MOV 36V	-
C	87063-017	V39ZA05	DESC MOV 39V	-
C	87063-018	V39ZA1	DESC MOV 39V	-
C	87063-019	V39ZA3	DESC MOV 39V	-
C	87063-020	V39ZA6	DESC MOV 39V	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	87063-021	V47ZA05	DESC MOV 47V	-
C	87063-022	V47ZA1	DESC MOV 47V	-
C	87063-023	V47ZA3	DESC MOV 47V	-
C	87063-024	V47ZA7	DESC MOV 47V	-
C	87063-025	V56ZA05	DESC MOV 56V	-
C	87063-026	V56ZA2	DESC MOV 56V	-
C	87063-027	V56ZA3	DESC MOV 56V	-
C	87063-028	V56ZA8	DESC MOV 56V	-
C	87063-029	V68ZA05	DESC MOV 68V	-
C	87063-030	V68ZA2	DESC MOV 68V	-
C	87063-031	V68ZA3	DESC MOV 68V	-
C	87063-032	V68ZA10	DESC MOV 68V	-
C	87063-033	V82ZA05	DESC MOV 82V	-
C	87063-034	V82ZA2	DESC MOV 82V	-
C	87063-035	V82ZA4	DESC MOV 82V	-
C	87063-036	V82ZA12	DESC MOV 82V	-
C	87063-037	V100ZA05	DESC MOV 100V	-
C	87063-038	V100ZA3	DESC MOV 100V	-
C	87063-039	V100ZA4	DESC MOV 100V	-
C	87063-040	V100ZA15	DESC MOV 100V	-
C	87063-041	V120ZA05	DESC MOV 120V	-
C	87063-042	V120ZA1	DESC MOV 120V	-
C	87063-043	V120ZA4	DESC MOV 120V	-
C	87063-044	V120ZA6	DESC MOV 120V	-
C	87063-045	V150ZA05	DESC MOV 150V	-
C	87063-046	V150ZA1	DESC MOV 150V	-
C	87063-047	V150ZA4	DESC MOV 150V	-
C	87063-048	V150ZA8	DESC MOV 150V	-
C	87063-049	V180ZA05	DESC MOV 180V	-
C	87063-050	V180ZA1	DESC MOV 180V	-
C	87063-051	V180ZA5	DESC MOV 180V	-
C	87063-052	V180ZA10	DESC MOV 180V	-
C	89007-2N7123TX		Power MOS 100V, 38A, 0.055Ω, 150W TO-204AE	-
C	89007-2N7123TXV		Power MOS 100V, 38A, 0.055Ω, 150W TO-204AE	-
C	89007-2N7124TX		Power MOS 200V, 30A, 0.085Ω, 150W, TO-204AE	-
C	89007-2N7124TXV		Power MOS 200V, 30A, 0.085Ω, 150W TO-204AE	-
C	89007-2N7125TX		Power MOS 400V, 14A, 00Ω, 150W TO-204AA	-
C	89007-2N7125TXV		Power MOS 400V, 14A, 00Ω, 150W TO-204AA	-
C	89007-2N7126TX		Power MOS 500V, 12A, 0.40Ω, 150W TO-204AA	-
C	89007-2N7126TXV		Power MOS 500V, 12A, 0.40Ω, 150W TO-204AA	-
C	89009-2N7119TX		Power MOS 100V, 14A, 08Ω, 75W TO-24AA	-
C	89009-2N7119TXV		Power MOS 100V, 14A, 08Ω, 75W TO-204AA	-
C	89009-2N7120TX		Power MOS 200V, 9A, 0.40Ω, 75W TO-204AA	-
C	89009-2N7120TXV		Power MOS 200V, 9A, 0.40Ω, 75W TO-204AA	-
C	89009-2N7121TX		Power MOS 400V, 5A, 1.0Ω, 75W TO-204AA	-
C	89009-2N7121TXV		Power MOS 400V, 5A, 1.0Ω, 75W TO-204AA	-
C	89009-2N7122TX		Power MOS 500V, 4A, 1Ω, 75W TO-204AA	-
C	89009-2N7122TXV		Power MOS 500V, 4A, 1Ω, 75W TO-204AA	-
C	89025-2N7241TX		Power MOS 100V, 14A, 095Ω, 75W TO-254AA	-
C	89025-2N7241TXV		Power MOS 100V, 14A, 095Ω, 75W TO-254AA	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	89025-2N7242TX		Power MOS 200V, 9A, 0.415Ω, 75W TO-254AA	-
C	89025-2N7242TXV		Power MOS 200V, 9A, 0.415Ω, 75W TO-254AA	-
C	89025-2N7243TX		Power MOS 400V, 5A, 1.0Ω, 75W TO-254AA	-
C	89025-2N7243TXV		Power MOS 400V, 5A, 1.0Ω, 75W TO-254AA	-
C	89025-2N7244TX		Power MOS 500V, 4A, 1Ω, 75W TO-254AA	-
C	89025-2N7244TXV		Power MOS 500V, 4A, 1Ω, 75W TO-254AA	-
C	90065-012	V131DB40	DESC MOV 40mm DA/DB	-
C	90065-013	V151DB40	DESC MOV 40mm DA/DB	-
C	90065-014	V251DB40	DESC MOV 40mm DA/DB	-
C	90065-015	V271DB40	DESC MOV 40mm DA/DB	-
C	90065-016	V321DB40	DESC MOV 40mm DA/DB	-
C	90065-017	V421DB40	DESC MOV 40mm DA/DB	-
C	90065-018	V481DB40	DESC MOV 40mm DA/DB	-
C	90065-019	V511DB40	DESC MOV 40mm DA/DB	-
C	90065-020	V571DB40	DESC MOV 40mm DA/DB	-
C	90065-021	V661DB40	DESC MOV 40mm DA/DB	-
C	90065-022	V751DB40	DESC MOV 40mm DA/DB	-
C	ACS00DMSR	5962F9565001VCC	Rad Hard Quad 2-Input NAND Gate	3563
C	ACS00KMSR	5962F9565001VXC	Rad Hard Quad 2-Input NAND Gate	3563
C	ACS03DMSR	5962F9670301VCC	Rad Hard Quad 2-Input NAND Gate with Open Drain	3064
C	ACS03KMSR	5962F9670301VXC	Rad Hard Quad 2-Input NAND Gate with Open Drain	3064
C	ACS08DMSR	5962F9565101VCC	Rad Hard Quad 2-Input AND Gate	3993
C	ACS08KMSR	5962F9565101VXC	Rad Hard Quad 2-Input AND Gate	3993
C	ACS10DMSR	5962F9565201VCC	Rad Hard Triple 3-Input NAND Gate	3630
C	ACS10KMSR	5962F9565201VXC	Rad Hard Triple 3-Input NAND Gate	3630
C	ACS20DMSR	5962F9565301VCC	Rad Hard Dual 4-Input NAND Gate	3616
C	ACS20KMSR	5962F9565301VXC	Rad Hard Dual 4-Input NAND Gate	3616
C	ACS74DMSR	5962F9679901VCC	Rad Hard Dual-D Flip-Flop w/Set & Reset, Positive Edge Trigger	-
C	ACS74KMSR	5962F9679901VXC	Rad Hard Dual-D Flip-Flop w/Set & Reset, Positive Edge Trigger	-
C	ACS86DMSR	5962F9565401VCC	Rad Hard Quad 2-Input Exclusive OR Gate	3995
C	ACS86KMSR	5962F9565401VXC	Rad Hard Quad 2-Input Exclusive OR Gate	3995
C	ACS112DMSR	5962F9670401VCC	Rad Hard Dual J-K Flip-Flop w/Set & Reset, Negative Edge Trigger	3571
C	ACS112KMSR	5962F9670401VXC	Rad Hard Dual J-K Flip-Flop w/Set & Reset, Negative Edge Trigger	3571
C	ACS125DMSR	5962F9670501VCC	Rad Hard Quad Buffer, Three-State	3565
C	ACS125KMSR	5962F9670501VXC	Rad Hard Quad Buffer, Three-State	3565
C	ACS138DMSR-02	592F9853401VEC	Rad Hard Single, 3-to-8 Line Decoder/Demux	4461
C	ACS138KMSR-02	592F9853401VXC	Rad Hard Single, 3-to-8 Line Decoder/Demux	4461
C	ACS139DMSR-02	5962F9763901VEC	Rad Hard Dual 2-to-4 Line Decoder/Demux	4431
C	ACS139KMSR-02	5962F9763901VXC	Rad Hard Dual 2-to-4 Line Decoder/Demux	4431
C	ACS151DMSR-02	5962F9764001VEC	Rad Hard 8-Input Multiplexer	4430
C	ACS151KMSR-02	5962F9764001VXC	Rad Hard 8-Input Multiplexer	4430
C	ACS157DMSR-02	5962F9853601VEC	Rad Hard Quad, 2-Input Multiplexer	4462
C	ACS157KMSR-02	5962F9853601VXC	Rad Hard Quad, 2-Input Multiplexer	4462
C	ACS161KMSR	5962F9670601VCC	Rad Hard Synchronous 4-Bit Binary Counter, Asynchronous Reset	3600
C	ACS161KMSR	5962F9670601VXC	Rad Hard Synchronous 4-Bit Binary Counter, Asynchronous Reset	3600
C	ACS245DMSR	5962F9670702VCC	Rad Hard Octal Bus Transceiver, Three-State	3198
C	ACS245KMSR	5962F9670702VXC	Rad Hard Octal Bus Transceiver, Three-State	3198
C	ACS253DMSR-02	5962F9800701VEC	Rad Hard Dual 4-Input Multiplexer, Three-State	4428
C	ACS253KMSR-02	5962F9800702VXC	Rad Hard Dual 4-Input Multiplexer, Three-State	4428
C	ACS257DMSR-02	5962F9800801VEC	Rad Hard Quad 2-Input Multiplexer, Three-State	4429

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	ACS257KMSR-02	5962F9800801VXC	Rad Hard Quad 2-Input Multiplexer, Three-State	4429
C	ACS280DMSR	5962F9670801VCC	Rad Hard 9-Bit Odd/Even Parity Generator Checker	3568
C	ACS280KMSR	5962F9670801VXC	Rad Hard 9-Bit Odd/Even Parity Generator Checker	3568
C	ACS373DMSR	5962F9565501VCC	Rad Hard Octal Transparent Latch, Three-State	3999
C	ACS373KMSR	5962F9565501VXC	Rad Hard Octal Transparent Latch, Three-State	3999
C	ACS374DMSR	5962F9565601VCC	Rad Hard Octal D Flip-Flop, Positive Edge Trigger	3997
C	ACS374KMSR	5962F9565601VXC	Rad Hard Octal D Flip-Flop, Positive Edge Trigger	3997
C	ACS521DMSR	5962F9670901VCC	Rad Hard 8-Bit Identity Comparator	3111
C	ACS521KMSR	5962F9670901VXC	Rad Hard 8-Bit Identity Comparator	3111
C	ACS541DMSR	5962F9671001VCC	Rad Hard Octal Three-State Buffer/Line Driver	4085
C	ACS541KMSR	5962F9671001VXC	Rad Hard Octal Three-State Buffer/Line Driver	4085
C	ACS573DMSR	5962F9672401VCC	Rad Hard Octal Transparent Latch, Three-State	4093
C	ACS573KMSR	5962F9672401VXC	Rad Hard Octal Transparent Latch, Three-State	4093
C	ACS630DMSR	5962F9671101VCC	Rad Hard 16-Bit Parallel EDAC	3199
C	ACS630KMSR	5962F9671101VXC	Rad Hard 16-Bit Parallel EDAC	3199
C	ACTS00DMSR	5962F9563601VCC	Rad Hard Quad 2-Input NAND Gate	3564
C	ACTS00KMSR	5962F9563601VXC	Rad Hard Quad 2-Input NAND Gate	3564
C	ACTS04DMSR	5962F9671201VCC	Rad Hard Hex Inverter	3383
C	ACTS04KMSR	5962F9671201VXC	Rad Hard Hex Inverter	3383
C	ACTS08DMSR	5962F9565701VCC	Rad Hard Quad 2-Input AND Gate	3994
C	ACTS08KMSR	5962F9565701VXC	Rad Hard Quad 2-Input AND Gate	3994
C	ACTS10DMSR	5962F9565801VCC	Rad Hard Triple 3-Input NAND Gate	3631
C	ACTS10KMSR	5962F9565801VXC	Rad Hard Triple 3-Input NAND Gate	3631
C	ACTS112DMSR	5962F9671401VCC	Rad Hard J-K Flip-Flop	3570
C	ACTS112KMSR	5962F9671401VXC	Rad Hard J-K Flip-Flop	3570
C	ACTS125DMSR	5962F9671501VCC	Rad Hard Quad Buffer, Three-State	3566
C	ACTS125KMSR	5962F9671501VXC	Rad Hard Quad Buffer, Three-State	3566
C	ACTS138DMSR-02	5962F9853501VEC	Rad Hard Single 3-to-8 Decoder/Demux	4460
C	ACTS138KMSR-02	5962F9853501VXC	Rad Hard Single 3-to-8 Decoder/Demux	4460
C	ACTS161DMSR	5962F9671601VCC	Rad Hard Synchronous 4-Bit Binary Counter, Asynchronous Reset	4095
C	ACTS161KMSR	5962F9671601VXC	Rad Hard Synchronous 4-Bit Binary Counter, Asynchronous Reset	4095
C	ACTS20DMSR	5962F9565901VCC	Rad Hard Dual 4-Input NAND Gate	3611
C	ACTS20KMSR	5962F9565901VXC	Rad Hard Dual 4-Input NAND Gate	3611
C	ACTS240DMSR	5962F9671701VCC	Rad Hard Octal Buffer/Line Driver, Three-State, Inverting	3186
C	ACTS240KMSR	5962F9671701VXC	Rad Hard Octal Buffer/Line Driver, Three-State, Inverting	3186
C	ACTS244DMSR	5962F9671801VCC	Rad Hard Octal Buffer/Line Driver, Three-State	3187
C	ACTS244KMSR	5962F9671801VXC	Rad Hard Octal Buffer/Line Driver, Three-State	3187
C	ACTS245DMSR	5962F9671901VCC	Rad Hard Octal Bus Transceiver, Three-State	3188
C	ACTS245KMSR	5962F9671901VXC	Rad Hard Octal Bus Transceiver, Three-State	3188
C	ACTS280DMSR	5962F9672001VCC	Rad Hard 9-Bit Odd/Even Parity Generator Checker	3569
C	ACTS280KMSR	5962F9672001VXC	Rad Hard 9-Bit Odd/Even Parity Generator Checker	3569
C	ACTS373DMSR	5962F9566101VCC	Rad Hard Octal Transparent Latch, Three-State	4000
C	ACTS373KMSR	5962F9566101VXC	Rad Hard Octal Transparent Latch, Three-State	4000
C	ACTS374DMSR	5962F9566201VCC	Rad Hard Octal D Flip-Flop, Positive Edge Trigger	3998
C	ACTS374KMSR	5962F9566201VXC	Rad Hard Octal D Flip-Flop, Positive Edge Trigger	3998
C	ACTS541DMSR	5962F9672601VCC	Rad Hard Octal Three-State Buffer/Line Driver	4094
C	ACTS541KMSR	5962F9672601VXC	Rad Hard Octal Three-State Buffer/Line Driver	4094
C	ACTS573DMSR	5962F9672501VCC	Rad Hard Octal Transparent Latch, Three-State	4092
C	ACTS573KMSR	5962F9672501VXC	Rad Hard Octal Transparent Latch, Three-State	4092
C	ACTS630DMSR	5962F9672101VCC	Rad Hard 16-Bit Parallel EDAC	3204

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	ACTS630KMSR	5962F9672101VXC	Rad Hard 16-Bit Parallel EDAC	3204
C	ACTS74DMSR	5962F9671301VCC	Rad Hard Dual-D Flip-Flop w/Set and Reset, Positive Edge Trigger	3382
C	ACTS74KMSR	5962F9671301VXC	Rad Hard Dual-D Flip-Flop w/Set and Reset, Positive Edge Trigger	3382
C	ACTS86DMSR	5962F9566001VCC	Rad Hard Quad 2-Input Exclusive OR Gate	3996
C	ACTS86KMSR	5962F9566001VXC	Rad Hard Quad 2-Input Exclusive OR Gate	3996
C	AD7520SD/883B		M-DAC, 10-Bit I-Out, 8-Bit Lin, 16 Lead CERDIP	3104
C	AD7520UD/883B		M-DAC, 10-Bit I-Out,10-Bit Lin, 6 Lead CERDIP	3104
N	CA0741T3		Op Amp, Single, Internal Compensation	531
N	CA3018A3		Transistor Array, General Purpose	762
N	CA30263		Differential Amp, Dual Independent	706
N	CA3028A3		Differential Amp, Differential/Cascade	382
N	CA3028B3		Differential Amp, Differential/Cascade	711
N	CA30393		Diode Array - 6 Ultra Fast	704
N	CA30453		Transistor Array, General Purpose	710
N	CA3045F3		Transistor Array, General Purpose	341
N	CA3049T3		Differential Amp, Dual High Frequency	611
N	CA3080A3		OTA Gateable Gain Blocks	709
N	CA3080AS3		OTA Gateable Gain Blocks, Formed Leads	709
N	CA3081F3		Transistor Array, High Current NPN	1331
N	CA3083F3W		Transistor Array, NPN	481
N	CA3085A3		Positive Voltage Regulator	708
N	CA3085AS3		Positive Voltage Regulator, Formed Leads	708
N	CA3085BS3		Positive Voltage Regulator, Formed Leads	708
N	CA3085BT3		Positive Voltage Regulator	708
N	CA3089F3W		FM IF System	561
N	CA3094AS3		Programmable Power/Switch Amp, Formed Leads	598
N	CA3094AT3		Programmable Power/Switch Amp	598
N	CA3094S3		Programmable Power/Switch Amp, Formed Leads	598
N	CA3094T3		Programmable Power/Switch Amp	598
N	CA3100T3		Wide Band Op Amp	825
N	CA3130AS3		BiMOS Op Amp, Formed Leads	817
N	CA3130AT3		BiMOS Op Amp, CMOS Output	817
N	CA3130S3		BiMOS Op Amp, Formed Leads	817
N	CA3130T3		BiMOS Op Amp, CMOS Output	817
N	CA3140AS3		BiMOS Op Amp, Formed Leads	957
N	CA3140AT3		Op Amp, General Purpose, Single	957
N	CA3140S3		Op Amp, General Purpose, Single, Formed Leads	957
N	CA3140T3		Op Amp, General Purpose, Single, BiMOS	957
N	CA3160AS3		Op Amp, General Purpose, Formed Leads	976
N	CA3160AT3		Op Amp, General Purpose, Single	976
N	CA3160T3		Op Amp, General Purpose, Single, BiMOS	976
N	CA3260AT3		Op Amp, Wideband, Dual, High Slew Rate	1724
N	CA3260T3		Op Amp, Wideband, Dual, High Slew Rate	1724
N	CA3280AF3		Op Amp, Wideband, Dual, High Slew Rate	1174
N	CA3290AT3		Comparator, Dual Voltage, General Purpose	1049
N	CA3306CJ3		Flash A/D - 20 LCC 6-Bit 10 MSPS	3102
N	CA3306D3		Flash A/D - 18 Side Brazed DIP 6-Bit 15 MSPS	3102
N	CA3306J3		Flash A/D - 20 LCC 6-Bit 15 MSPS	3102
C	CD14538BDMSR	5962R9670201VEC	Rad Hard Dual Precision Monostable Multivibrator	3192
C	CD14538BF3A	5962-9055701EA	Dual Precision Monostable Multivibrator	7012

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD14538BKMSR	5962R9670201VXC	Rad Hard Dual Precision Monostable Multivibrator	3192
C	CD4000AFB	JM38510/05201BCA	Dual 3-Input NOR Gate Plus Inverter	-
C	CD4000BDMSR	5962R9582601VCC	Dual 3-Input NOR Gate Plus Inverter, Rad Hard	3289
C	CD4000BKMSR	5962R9582601VXC	Dual 3-Input NOR Gate Plus Inverter, Rad Hard	3289
C	CD4001AFB	JM38510/05202BCA	Quad 2-Input NOR Gate	-
C	CD4001BDMSR	5962R9582602VCC	Quad 2-Input NOR Gate, Rad Hard	3289
C	CD4001BF3A		Quad 2-Input NOR Gate	7012
C	CD4001BFB	JM38510/05252BCA	Quad 2-Input NOR Gate	-
N	CD4001BK3		Quad 2-Input NOR Gate, Weldseal Field Programmable	7012
C	CD4001BKMSR	5962R9582602VXC	Quad 2-Input NOR Gate, Rad Hard	3289
C	CD4001UBF3A		Quad 2-Input NOR Gate, Unbuffered	7012
C	CD4002BDMSR	5962R9582603VCC	Dual 4-Input NOR Gate, Rad Hard	3289
C	CD4002BDNSR	5962R9582606VCC	Dual 4-Input NOR Gate, Rad Hard, w/Neutron	3289
C	CD4002BF3A	7704403CA	Dual 4-Input NOR Gate, Dual Brand	7012
N	CD4002BK3		Dual 4-Input NOR Gate, Weldseal Field Programmable	7012
C	CD4002BKMSR	5962R9582603VXC	Dual 4-Input NOR Gate, Rad Hard	3289
C	CD4006BDMSR	5962R9661701VCC	18-Stage Static Shift Register, Rad Hard	3290
C	CD4006BF3A		18-Stage Static Shift Register	7012
C	CD4006BKMSR	5962R9661701VXC	18-Stage Static Shift Register, Rad Hard	3290
C	CD4007UBDMSR	5962R9661801VCC	Dual Complementary Pair Plus Inverter, Rad Hard	3291
C	CD4007UBF3A		Dual Complementary Pair Plus Inverter, Unbuffered	7012
C	CD4007UBKMSR	5962R9661801VXC	Dual Complementary Pair Plus Inverter, Rad Hard	3291
C	CD4008BDMSR	5962R9661901VEC	4-Bit Full Adder with Parallel Carry-Out, Rad Hard	3292
C	CD4008BF3A		4-Bit Full Adder with Parallel Carry-Out	7012
C	CD4008BKMSR	5962R9661901VXC	4-Bit Full Adder with Parallel Carry-Out, Rad Hard	3292
C	CD4009UBDMSR	5962R9662001VEC	Hex Buffer/Converter, Inverting, Rad Hard	3293
C	CD4009UBF3A		Hex Buffer/Converter, Unbuffered	7012
C	CD4009UBKMSR	5962R9662001VXC	Hex Buffer/Converter, Inverting, Rad Hard	3293
C	CD40100BDMSR	5962R9659801VEC	9-Bit Parity Generator/Checker, Rad Hard	3349
C	CD40100BKMSR	5962R9659801VXC	9-Bit Parity Generator/Checker, Rad Hard	3349
C	CD40101BDMSR	5962R9659901VCC	9-Bit Parity Generator/Checker, Rad Hard	3350
C	CD40101BF3A		9-Bit Parity Generator/Checker	7012
C	CD40101BKMSR	5962R9659901VXC	9-Bit Parity Generator/Checker, Rad Hard	3350
C	CD40102BDMSR	5962R9660001VEC	Presettable 2-Decade BCD Down Counter, Rad Hard	3351
C	CD40102BKMSR	5962R9660001VXC	Presettable 2-Decade BCD Down Counter, Rad Hard	3351
C	CD40103BDMSR	5962R9660002VEC	Presettable 8-Bit Binary Down Counter, Rad Hard	3351
C	CD40103BF3A		Presettable 8-Bit Binary Down Counter	7012
C	CD40103BKMSR	5962R9660002VXC	Presettable 8-Bit Binary Down Counter, Rad Hard	3351
C	CD40104BDMSR	5962R9660101VEC	4-Bit Bidirectional Universal Shift Register, Rad Hard	3352
C	CD40104BKMSR	5962R9660101VXC	4-Bit Bidirectional Universal Shift Register, Rad Hard	3352
C	CD40105BDMSR	5962R9660201VEC	4-Bit x 16 Word FIFO Buffer Register, Rad Hard	3353
C	CD40105BF3A		4-Bit x 16 Word FIFO Buffer Register	7012
C	CD40105BKMSR	5962R9660201VXC	4-Bit x 16 Word FIFO Buffer Register, Rad Hard	3353
C	CD40106BDMSR	5962R9660301VCC	Hex Schmitt Trigger, Rad Hard	3354
C	CD40106BF3A		Hex Schmitt Trigger	7012
C	CD40106BKMSR	5962R9660301VXC	Hex Schmitt Trigger, Rad Hard	3354
C	CD40107BDMSR	5962R9664401VCC	Dual 2-Input NAND Buffer/Driver, Rad Hard	3355
C	CD40107BF3A		Dual 2-Input NAND Buffer/Driver	7012
C	CD40107BKMSR	5962R9664401VXC	Dual 2-Input NAND Buffer/Driver, Rad Hard	3355
N	CD40108BD3		4 x 4 Multiport Register, Weldseal DIC	7012

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD40108BDMSR	5962R9668201VJC	4 x 4 Multiport Register, Rad Hard	3356
C	CD40108BKMSR	5962R9668201VXC	4 x 4 Multiport Register, Rad Hard	3356
C	CD40109BDMSR	5962R9664501VEC	Quad Low-to-High Voltage Interface, Rad Hard	3196
C	CD40109BF3A		Quad Low-to-High Voltage Interface	7012
N	CD40109BK3		Quad Low-to-High Voltage Interface Field Programmable	7012
C	CD40109BKMSR	5962R9664501VXC	Quad Low-to-High Voltage Interface, Rad Hard	3196
C	CD4010BDMSR	5962R9582901VEC	Hex Buffer/Converter, Non-Inverting, Rad Hard	3078
C	CD4010BF3A		Hex Buffer/Converter, Non-Inverting	7012
C	CD4010BKMSR	5962R9582901VXC	Hex Buffer/Converter, Non-Inverting, Rad Hard	3078
C	CD40110BDMSR	5962R9 TBD	Decade Up/Down Counter/Decoder/Latch Display Driver Rad Hard	-
C	CD40110BKMSR	5962R9 TBD	Decade Up/Down Counter/Decoder/Latch Display Driver Rad Hard	-
N	CD40116D3		8-Bit Bidirectional CMOS To TTL Level Interface	7012
N	CD4011AD3		Quad 2-Input NAND Gate, Weldseal DIC	7012
C	CD4011AFB	JM38510/05001BCA	Quad 2-Input NAND Gate	-
C	CD4011BDMSR	5962R9662101VCC	Quad 2-Input NAND Gate, Rad Hard	3079
C	CD4011BF3A		Quad 2-Input NAND Gate	7012
C	CD4011BFB	JM38510/05051BCA	Quad 2-Input NAND Gate	-
N	CD4011BK3		Quad 2-Input NAND Gate, Weldseal Flatpack	7012
C	CD4011BKMSR	5962R9662101VXC	Quad 2-Input NAND Gate, Rad Hard	3079
C	CD4011UBF3A		Quad 2-Input NAND Gate	7012
C	CD4012BDMSR	5962R9662102VCC	Dual 4-Input NAND Gate, Rad Hard	3079
C	CD4012BF3A		Dual 4-Input NAND Gate	7012
C	CD4012BFB	JM38510/05052BCA	Dual 4-Input NAND Gate	-
C	CD4012BKMSR	5962R9662102VXC	Dual 4-Input NAND Gate, Rad Hard	3079
C	CD4013AFB	JM38510/05101BCA	Dual D Flip-Flop with Set/Reset Capability	-
C	CD4013BDMSR	5962R9662201VCC	Dual D Flip-Flop with Set/Reset Capability, Rad Hard	3080
C	CD4013BF3A		Dual D Flip-Flop with Set/Reset Capability	7012
C	CD4013BFB	JM38510/05151BCA	Dual D Flip-Flop with Set/Reset Capability	-
N	CD4013BK3		Dual D Flip-Flop with Set/Reset Capability	7012
C	CD4013BKMSR	5962R9662201VXC	Dual D Flip-Flop with Set/Reset Capability, Rad Hard	3080
C	CD40147BDMSR	5962R9660401VEC	10-Line To 4-Line BCD Priority Encoder, Rad Hard	3357
C	CD40147BKMSR	5962R9660401VXC	10-Line To 4-Line BCD Priority Encoder, Rad Hard	3357
C	CD4014BDMSR	5962R9662301VEC	8-Stage Static Shift Register, Rad Hard	3294
C	CD4014BF3A		8-Stage Static Shift Register	7012
C	CD4014BKMSR	5962R9662301VXC	8-Stage Static Shift Register, Rad Hard	3294
C	CD4015BDMSR	5962R9662401VEC	Dual 4-Stage Static Shift Register, Rad Hard	3295
C	CD4015BF3A		Dual 4-Stage Static Shift Register	7012
C	CD4015BKMSR	5962R9662401VXC	Dual 4-Stage Static Shift Register, Rad Hard	3295
C	CD40160BDMSR	5962R9667601VEC	4-Bit Decade Counter with Asynchronous Clear, Rad Hard	3358
C	CD40160BF3A		4-Bit Decade Counter with Asynchronous Clear	7012
C	CD40160BKMSR	5962R9667601VXC	4-Bit Decade Counter with Asynchronous Clear, Rad Hard	3358
C	CD40161BDMSR	5962R9667602VEC	4-Bit Binary Counter with Asynchronous Clear, Rad Hard	3358
C	CD40161BF3A		4-Bit Binary Counter with Asynchronous Clear	7012
C	CD40161BKMSR	5962R9667602VXC	4-Bit Binary Counter with Asynchronous Clear, Rad Hard	3358
C	CD40162BDMSR	5962R9667603VEC	4-Bit Decade Counter with Synchronous Clear, Rad Hard	3358
C	CD40162BKMSR	5962R9667603VXC	4-Bit Decade Counter with Synchronous Clear, Rad Hard	3358
C	CD40163BDMSR	5962R9667604VEC	4-Bit Binary Counter with Synchronous Clear, Rad Hard	3358
C	CD40163BF3A		4-Bit Binary Counter with Synchronous Clear	7012

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD40163BKMSR	5962R9667604VXC	4-Bit Binary Counter with Synchronous Clear, Rad Hard	3358
C	CD4016BDMSR	5962R9670101VCC	Quad Bilateral Switch, Rad Hard	3296
C	CD4016BF3A	5962-9064001CA	Quad Bilateral Switch, Dual Brand	7012
C	CD4016BKMSR	5962R9670101VXC	Quad Bilateral Switch, Rad Hard	3296
C	CD40174BDMSR	5962R9660501VEC	4-Bit Binary Counter with Synchronous Clear, Rad Hard	3359
C	CD40174BF3A		4-Bit Binary Counter with Synchronous Clear	7012
C	CD40174BKMSR	5962R9660501VXC	4-Bit Binary Counter with Synchronous Clear, Rad Hard	3359
C	CD40175BDMSR	5962R9660601VEC	Quad D-Type Flip-Flop, Rad Hard	3360
C	CD40175BF3A		Quad D-Type Flip-Flop	7012
C	CD40175BKMSR	5962R9660601VXC	Quad D-Type Flip-Flop, Rad Hard	3360
C	CD4017AFB	JM38510/05601BEA	Decade Counter/Divider	-
C	CD4017BDMSR	5962R9662501VEC	Decade Counter/Divider, Rad Hard	3297
C	CD4017BF3A		Decade Counter/Divider	7012
C	CD4017BFB	JM38510/05651BEA	Decade Counter/Divider	-
C	CD4017BKMSR	5962R9662501VXC	Decade Counter/Divider, Rad Hard	3297
C	CD40181BDMSR	5962R9668301VJC	4-Bit Arithmetic Logic Unit, Rad Hard	3361
C	CD40181BKMSR	5962R9668301VXC	4-Bit Arithmetic Logic Unit, Rad Hard	3361
C	CD40182BDMSR	5962R9660701VEC	Look-Ahead Carry Generator, Rad Hard	3362
C	CD40182BKMSR	5962R9660701VXC	Look-Ahead Carry Generator, Rad Hard	3362
C	CD4018BDMSR	5962R9662602VEC	Presettable Divide-By N Counter, Rad Hard	3298
C	CD4018BF3A		Presettable Divide-By N Counter	7012
C	CD4018BFB	JM38510/05652BEA	Presettable Divide-By N Counter	-
C	CD4018BK3		Presettable Divide-By N Counter, Field Programmable	7012
C	CD4018BKMSR	5962R9662602VXC	Presettable Divide-By N Counter, Rad Hard	3298
C	CD40192BDMSR	5962R9660801VEC	Look-Ahead Carry Generator, Rad Hard	3363
C	CD40192BF3A		Look-Ahead Carry Generator	7012
C	CD40192BKMSR	5962R9660801VXC	Look-Ahead Carry Generator, Rad Hard	3363
C	CD40193BDMSR	5962R9660802VEC	Presettable Up/Down Counter, Rad Hard	3363
C	CD40193BF3A		Presettable Up/Down Counter	7012
C	CD40193BKMSR	5962R9660802VXC	Presettable Up/Down Counter, Rad Hard	3363
C	CD40194BDMSR	5962R9660102VEC	4-Bit Bidirectional Universal Shift Register, Rad Hard	3352
C	CD40194BKMSR	5962R9660102VXC	4-Bit Bidirectional Universal Shift Register, Rad Hard	3352
C	CD4019AFB	JM38510/05302BEA	Quad AND/OR Select Gate	-
C	CD4019BDMSR	5962R9662701VEC	Quad AND/OR Select Gate, Rad Hard	3299
C	CD4019BF3A		Quad AND/OR Select Gate	7012
C	CD4019BFB	JM38510/05352BEA	Quad AND/OR Select Gate	-
C	CD4019BKMSR	5962R9662701VXC	Quad AND/OR Select Gate, Rad Hard	3299
C	CD40208BDMSR	5962R9668401VLC	4 x 4 Multiport Register, Rad Hard	3396
C	CD40208BKMSR	5962R9668401VXC	4 x 4 Multiport Register, Rad Hard	3396
C	CD4020AFB	JM38510/05603BEA	14-Stage Binary Ripple Counter	7012
C	CD4020BDMSR	5962R9662801VEC	14-Stage Binary Ripple Counter, Rad Hard	3300
C	CD4020BF3A		14-Stage Binary Ripple Counter	7012
C	CD4020BFB	JM38510/05653BEA	14-Stage Binary Ripple Counter	-
C	CD4020BKMSR	5962R9662801VYC	14-Stage Binary Ripple Counter, Rad Hard	3300
C	CD4021BDMSR	5962R9662302VEC	8-Stage Static Shift Register, Rad Hard	3294
C	CD4021BF3A		8-Stage Static Shift Register	7012
C	CD4021BFB	JM38510/05754BEA	8-Stage Static Shift Register	-
C	CD4021BKMSR	5962R9662302VXC	8-Stage Static Shift Register, Rad Hard	3294
C	CD4022BDMSR	5962R9662502VEC	Divide-By-8 Counter/Divider, Rad Hard	3297
C	CD4022BF3A		Divide-By-8 Counter/Divider	7012

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD4022BKMSR	5962R9662502VXC	Divide-By-8 Counter/Divider, Rad Hard	3297
C	CD4023AFB	JM38510/05003BCA	Triple 3-Input NAND Gate	-
C	CD4023BDMSR	5962R9662103VCC	Triple 3-Input NAND Gate, Rad Hard	3079
C	CD4023BF3A		Triple 3-Input NAND Gate	7012
C	CD4023BFB	JM38510/05053BCA	Triple 3-Input NAND Gate	-
N	CD4023BK3		Triple 3-Input NAND Gate, Field Programmable	7012
C	CD4023BKMSR	5962R9662103VXC	Triple 3-Input NAND Gate, Rad Hard	3079
C	CD4024AFB	JM38510/05605BCA	7-Stage Binary Ripple Counter	-
C	CD4024BDMSR	5962R9662803VCC	7-Stage Binary Ripple Counter, Rad Hard	3300
C	CD4024BF3A		7-Stage Binary Ripple Counter	7012
C	CD4024BFB	JM38510/05655BCA	7-Stage Binary Ripple Counter	-
C	CD4024BKMSR	5962R9662803VXC	7-Stage Binary Ripple Counter, Rad Hard	3300
C	CD40257BDMSR	5962R9667701VCC	Quad 2-Line to 1-Line Data Selector/MUX, Rad Hard	3364
C	CD40257BF3A		Quad 2-Line to 1-Line Data Selector/MUX	7012
C	CD40257BKMSR	5962R9667701VXC	Quad 2-Line to 1-Line Data Selector/MUX, Rad Hard	3364
C	CD4025AFB	JM38510/05204BCA	Triple 3-Input NOR Gate	-
C	CD4025BDMSR	5962R9582604VCC	Triple 3-Input NOR Gate, Rad Hard	3289
C	CD4025BF3A		Triple 3-Input NOR Gate	7012
C	CD4025BFB	JM38510/05254BCA	Triple 3-Input NOR Gate	-
C	CD4025BKMSR	5962R9582604VCC	Triple 3-Input NOR Gate, Rad Hard	3289
C	CD4027AFB	JM38510/05102BEA	Dual J-K Flip-Flop with Set/Reset Capability	-
C	CD4027BDMSR	5962R9662901VEC	Dual J-K Flip-Flop with Set/Reset Capability, Rad Hard	3302
C	CD4027BF3A		Dual J-K Flip-Flop with Set/Reset Capability	7012
C	CD4027BFB	JM38510/05152BEA	Dual J-K Flip-Flop with Set/Reset Capability	-
N	CD4027BK3		Dual J-K Flip-Flop with Set/Reset Capability	7012
C	CD4027BKMSR	5962R9662901VXC	Dual J-K Flip-Flop with Set/Reset Capability, Rad Hard	3302
C	CD4028BDMSR	5962R9663001VEC	BCD-to-Decimal Decoder, Rad Hard	3303
C	CD4028BF3A		BCD-to-Decimal Decoder	7012
C	CD4028BKMSR	5962R9663001VXC	BCD-to-Decimal Decoder, Rad Hard	3303
C	CD4029BDMSR	5962R9562101VEC	Presettable Up/Down Counter, Rad Hard	3304
C	CD4029BF3A	8101602EA	Presettable Up/Down Counter, Dual Brand	7012
C	CD4029BKMSR	5962R9562101VXC	Presettable Up/Down Counter, Rad Hard	3304
C	CD4030BDMSR	5962R9664601VCC	Quad Exclusive OR Gate, Rad Hard	3305
C	CD4030BF3A		Quad Exclusive-OR Gate	7012
C	CD4030BFB	JM38510/05353BCA	Quad Exclusive-OR Gate	-
C	CD4030BKMSR	5962R9664601VXC	Quad Exclusive OR Gate, Rad Hard	3305
C	CD4031BDMSR	5962R9664701VEC	64-Stage Static Shift Register, Rad Hard	3306
C	CD4031BF3A		64-Stage Static Shift Register	7012
C	CD4031BKMSR	5962R9664701VXC	64-Stage Static Shift Register, Rad Hard	3306
C	CD4033BDMSR	5962R9664801VEC	Decade Counter/Divider, Rad Hard	3301
C	CD4033BKMSR	5962R9664801VXC	Decade Counter/Divider, Rad Hard	3301
C	CD4034BDMSR	5962R9667801VJC	8-Stage Static Shift Register, Rad Hard	3307
C	CD4034BF3A		8-Stage Static Shift Register	7012
C	CD4034BKMSR	5962R9667801VXC	8-Stage Static Shift Register, Rad Hard	3307
C	CD4035BDMSR	5962R9664901VEC	4-Stage Parallel-In/Parallel-Out Shift Register, Rad Hard	3308
C	CD4035BF3A	8101701EA	4-Stage Parallel-In/Parallel-Out Shift Register	7012
C	CD4035BKMSR	5962R9664901VXC	4-Stage Parallel-In/Parallel-Out Shift Register, Rad Hard	3308
C	CD4040BDMSR	5962R9662805VEC	12-Stage Binary Ripple Counter, Rad Hard	3300
C	CD4040BF3A		12-Stage Binary Ripple Counter	7012
C	CD4040BKMSR	5962R9662805VXC	12-Stage Binary Ripple Counter, Rad Hard	3300

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD4041UBDMSR	5962R9663201VCC	Quad True/Complement Buffer, Rad Hard	3309
C	CD4041UBF3A	5962R9	Quad True/Complement Buffer	7012
C	CD4041UBKMSR	5962R9663201VXC	Quad True/Complement Buffer, Rad Hard	3309
C	CD4042BDMSR	5962R9663301VEC	Quad Clocked D-Latch, Rad Hard	3310
C	CD4042BF3A		Quad Clocked D Latch	7012
N	CD4042BK3		Quad Clocked D Latch, Weldseal Flatpack	7012
C	CD4042BKMSR	5962R9663301VXC	Quad Clocked D Latch, Rad Hard	3310
C	CD4043BDMSR	5962R9663401VEC	Quad NOR R/S Latch, Three-State Outputs, Rad Hard	3311
C	CD4043BF3A		Quad NOR R/S Latch, Three-State Outputs	7012
C	CD4043BKMSR	5962R9663401VXC	Quad NOR R/S Latch, Three-State Outputs, Rad Hard	3311
C	CD4044BDMSR	5962R9663402VEC	Quad NAND R/S Latch, Three-State Outputs, Rad Hard	3311
C	CD4044BF3A		Quad NAND R/S Latch, Three-State Outputs	7012
C	CD4044BKMSR	5962R9663402VXC	Quad NAND R/S Latch, Three-State Outputs, Rad Hard	3311
C	CD4046BDMSR	5962R9666401VEC	Micropower Phase-Locked Loop, Rad Hard	3312
C	CD4046BF3A		Micropower Phase-Locked Loop	7012
C	CD4046BKMSR	5962R9666401VXC	Micropower Phase-Locked Loop, Rad Hard	3312
N	CD4047BD3		Monostable/Astable Multivibrator, Weldseal DIC	7012
C	CD4047BDMSR	5962R9663501VCC	Monostable/Astable Multivibrator, Rad Hard	3313
C	CD4047BF3A	8102001CA	Monostable/Astable Multivibrator, Dual Brand	7012
C	CD4047BKMSR	5962R9663501VXC	Monostable/Astable Multivibrator, Rad Hard	3313
C	CD4048BDMSR	5962R9665001VEC	Multifunctional Expandable 8-Input Gate, Three-State Output Rad Hard	3314
C	CD4048BF3A		Multifunctional Expandable 8-Input Gate, Three-State Output	7012
C	CD4048BKMSR	5962R9665001VXC	Multifunctional Expandable 8-Input Gate, Three-State Output Rad Hard	3314
C	CD4049AFB	JM38510/05503BEA	Hex Buffer/Converter, Inverting	-
C	CD4049UBDMSR	5962R9663601VEC	Hex Buffer/Converter, Inverting, Rad Hard	3315
C	CD4049UBF3A		Hex Buffer/Converter, Inverting	7012
C	CD4049UBFB	JM38510/05553BEA	Hex Buffer/Converter, Inverting,	-
N	CD4049UBK3		Hex Buffer/Converter, Inverting, Weldseal Field Programmable	7012
C	CD4049UBKMSR	5962R9663601VXC	Hex Buffer/Converter, Inverting, Rad Hard	3315
C	CD4050AFB	JM38510/05504BEA	Hex Buffer/Converter, Non-Inverting	-
C	CD4050BDMSR	5962R9663701VEC	Hex Buffer/Converter, Non-Inverting, Rad Hard	3193
C	CD4050BF3A		Hex Buffer/Converter, Non-Inverting	7012
C	CD4050BFB	JM38510/05554BEA	Hex Buffer/Converter, Non-Inverting	-
C	CD4050BKMSR	5962R9663701VXC	Hex Buffer/Converter, Non-Inverting, Rad Hard	3193
C	CD4051BDMSR	5962R9665101VEC	8-Channel Analog MUX/DeMUX, Rad Hard	3316
C	CD4051BF3A		8-Channel Analog MUX/DeMUX	7012
C	CD4051BKMSR	5962R9665101VXC	8-Channel Analog MUX/DeMUX, Rad Hard	3316
C	CD4052BDMSR	5962R9665102VEC	4-Channel Analog MUX/DeMUX, Rad Hard	3316
C	CD4052BF3A	7901502EA	4-Channel Analog MUX/DeMUX, Dual Brand	7012
C	CD4052BKMSR	5962R9665102VXC	4-Channel Analog MUX/DeMUX, Rad Hard	3316
C	CD4053BDMSR	5962R9665103VEC	Triple 2-Channel Analog MUX/DeMUX, Rad Hard	3316
C	CD4053BF3A	8101801EA	Triple 2-Channel Analog MUX/DeMUX, Dual Brand	7012
C	CD4053BKMSR	5962R9665103VXC	Triple 2-Channel Analog MUX/DeMUX, Rad Hard	3316
C	CD4054BF3A		4-Segment Display Coder Driver	7012
C	CD4056BF3A		BCD To 7-Segment Driver Strobe Latch	7012
N	CD4059AD3		Programmable Divide-By-N Counter, Weldseal DIC	7012
C	CD4060BDMSR	5962R9660901VEC	14-Stage Binary Ripple Counter/Divider, Rad Hard	3317
C	CD4060BF3A		14-Stage Binary Ripple Counter/Divider	7012

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD4060BKMSR	5962R9660901VXC	14-Stage Binary Ripple Counter/Divider, Rad Hard	3317
C	CD4063BDMSR	5962R9675701VEC	4-Bit Magnitude Comparator, Rad Hard	3318
C	CD4063BF3A		4-Bit Magnitude Comparator	7012
C	CD4063BKMSR	5962R9675701VXC	4-Bit Magnitude Comparator, Rad Hard	3318
C	CD4066BDMSR	5962R9665201VEC	Quad Bilateral Switch, Rad Hard	3319
C	CD4066BF3A		Quad Bilateral Switch	7012
C	CD4066BFB	JM38510/05852BCA	Quad Bilateral Switch	-
N	CD4066BK3		Quad Bilateral Switch, Weldseal Flatpack	7012
C	CD4066BKMSR	5962R9665201VXC	Quad Bilateral Switch, Rad Hard	3319
C	CD4067BDMSR	5962R9667901VLC	16-Channel Analog MUX/DeMUX, Rad Hard	3190
C	CD4067BF3A		16-Channel Analog MUX/DeMUX	7012
C	CD4067BKMSR	5962R9667901VXC	16-Channel Analog MUX/DeMUX, Rad Hard	3190
C	CD4068BDMSR	5962R9661001VCC	8-Input NAND/AND Gate, Rad Hard	3320
C	CD4068BF3A		8-Input NAND/AND Gate	7012
C	CD4068BKMSR	5962R9661001VXC	8-Input NAND/AND Gate, Rad Hard	3320
C	CD4069UBDMSR	5962R9665301VCC	Hex Inverter, Rad Hard	3321
C	CD4069UBF3A		Hex Inverter	7012
C	CD4069UBFB	JM38510/17401BCA	Hex Inverter	-
C	CD4069UBKMSR	5962R9665301VXC	Hex Inverter, Rad Hard	3321
C	CD4070BDMSR	5962R9661101VCC	Quad Exclusive-OR Gate, Rad Hard	3322
C	CD4070BF3A		Quad Exclusive-OR Gate	7012
C	CD4070BFB	JM38510/17203BCA	Quad Exclusive-OR Gate	-
C	CD4070BKMSR	5962R9661101VXC	Quad Exclusive-OR Gate, Rad Hard	3322
C	CD4071BDMSR	5962R9665401VCC	Quad 2-Input OR Gate, Rad Hard	3323
C	CD4071BF3A		Quad 2-Input OR Gate	7012
C	CD4071BFB	JM38510/17101BCA	Quad 2-Input OR Gate	-
C	CD4071BKMSR	5962R9665401VXC	Quad 2-Input OR Gate, Rad Hard	3323
C	CD4072BDMSR	5962R9665403VCC	Dual 4-Input OR Gate, Rad Hard	3323
C	CD4072BF3A	7706002CA	Dual 4-Input OR Gate, Dual Brand	7012
C	CD4072BKMSR	5962R9665403VXC	Dual 4-Input OR Gate, Rad Hard	3323
C	CD4073BDMSR	5962R9665501VCC	Triple 3-Input AND Gate, Rad Hard	3324
C	CD4073BF3A		Triple 3-Input AND Gate	7012
C	CD4073BFB	JM38510/17003BCA	Triple 3-Input AND Gate	-
C	CD4073BKMSR	5962R9665501VXC	Triple 3-Input AND Gate, Rad Hard	3324
C	CD4075BDMSR	5962R9665405VCC	Triple 3-Input OR Gate, Rad Hard	3323
C	CD4075BF3A		Triple 3-Input OR Gate	7012
C	CD4075BFB	JM38510/17103BCA	Triple 3-Input OR Gate	-
C	CD4075BKMSR	5962R9665405VXC	Triple 3-Input OR Gate, Rad Hard	3323
C	CD4076BDMSR	5962R9665601VEC	4-Bit D Flip-Flop, Three-State Outputs, Rad Hard	3325
C	CD4076BF3A		4-Bit D Flip-Flop, Three-State Outputs	7012
C	CD4076BKMSR	5962R9665601VXC	4-Bit D Flip-Flop, Three-State Outputs, Rad Hard	3325
C	CD4077BDMSR	5962R9661102VCC	Quad Exclusive NOR Gate, Rad Hard	3322
C	CD4077BF3A		Quad Exclusive NOR Gate	7012
C	CD4077BKMSR	5962R9661102VXC	Quad Exclusive NOR Gate, Rad Hard	3322
C	CD4078BDMSR	5962R9663801VCC	8-Bit NOR/OR Gate, Rad Hard	3326
C	CD4078BF3A	7704402CA	8-Bit NOR/OR Gate, Dual Brand	7012
C	CD4078BKMSR	5962R9663801VXC	8-Bit NOR/OR Gate, Rad Hard	3326
C	CD4081BDMSR	5962R9665502VCC	Quad 2-Input AND Gate, Rad Hard	3324
C	CD4081BF3A	7702402CA	Quad 2-Input AND Gate, Dual Brand	7012
C	CD4081BFB	JM38510/17001BCA	Quad 2-Input AND Gate	-

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD4081BKMSR	5962R9665502VXC	Quad 2-Input AND Gate, Rad Hard	3324
C	CD4082BDMSR	5962R9665503VCC	Dual 4-Input AND Gate, Rad Hard	3324
C	CD4082BF3A	7705902CA	Dual 4-Input AND Gate, Dual Brand	7012
C	CD4082BFB	JM38510/17002BCA	Dual 4-Input AND Gate	-
C	CD4082BKMSR	5962R9665503VXC	Dual 4-Input AND Gate, Rad Hard	3324
C	CD4085BDMSR	5962R9663901VCC	Dual 2-Wide 2-Input AND/OR/Invert (AOI) Gate, Rad Hard	3327
C	CD4085BF3A		Dual 2-Wide 2-Input AND/OR/Invert (AOI) Gate	7012
C	CD4085BKMSR	5962R9663901VXC	Dual 2-Wide 2-Input AND/OR/Invert (AOI) Gate, Rad Hard	3327
C	CD4086BDMSR	5962R9664001VCC	4-Wide 2-Input AND/OR/Invert Gate, Rad Hard	3328
C	CD4086BF3A		4-Wide 2-Input AND/OR/Invert Gate	7012
C	CD4086BKMSR	5962R9664001VXC	4-Wide 2-Input AND/OR/Invert Gate, Rad Hard	3328
C	CD4089BDMSR	5962R9661201VEC	Binary Rate Multiplier, Rad Hard	3329
C	CD4089BF3A		Binary Rate Multiplier	7012
C	CD4089BKMSR	5962R9661201VXC	Binary Rate Multiplier, Rad Hard	3329
C	CD4093BDMSR	5962R9664101VCC	Quad 2-Input NAND Schmitt Trigger, Rad Hard	3330
C	CD4093BF3A	7704602CA	Quad 2-Input NAND Schmitt Trigger, Dual Brand	7012
C	CD4093BKMSR	5962R9664101VXC	Quad 2-Input NAND Schmitt Trigger, Rad Hard	3330
C	CD4094BDMSR	5962R9664201VEC	8-Stage Shift-and-Store Bus Register, Rad Hard	3194
C	CD4094BF3A	7702501EA	8-Stage Shift-and-Store Bus Register, Dual Brand	7012
C	CD4094BKMSR	5962R9664201VXC	8-Stage Shift-and-Store Bus Register, Rad Hard	3194
C	CD4095BDMSR	5962R9661301VCC	Gated J-K Flip-Flop, Non-Inverting, Rad Hard	3331
C	CD4095BF3A		Gated J-K Flip-Flop, Non-Inverting	7012
C	CD4095BKMSR	5962R9661301VXC	Gated J-K Flip-Flop, Non-Inverting, Rad Hard	3331
C	CD4096BDMSR	5962R9661302VCC	Gated J-K Flip-Flop, Inverting and Non-Inverting, Rad Hard	3331
C	CD4096BKMSR	5962R9661302VXC	Gated J-K Flip-Flop, Inverting and Non-Inverting, Rad Hard	3331
C	CD4097BDMSR	5962R9667902VLC	8-Channel Analog MUX/DeMUX, Rad Hard	3190
C	CD4097BKMSR	5962R9667902VXC	8-Channel Analog MUX/DeMUX, Rad Hard	3190
C	CD4098BDMSR	5962R9661402VEC	Dual Monostable Multivibrator, Rad Hard	3332
C	CD4098BF3A		Dual Monostable Multivibrator	7012
C	CD4098BFB	JM38510/17504BEA	Dual Monostable Multivibrator	-
C	CD4098BKMSR	5962R9661402VXC	Dual Monostable Multivibrator, Rad Hard	3332
C	CD4099BDMSR	5962R9661501VEC	8-Bit Addressable Latch, Rad Hard	3333
C	CD4099BF3A		8-Bit Addressable Latch	7012
C	CD4099BFB	JM38510/17601BEA	8-Bit Addressable Latch	-
C	CD4099BKMSR	5962R9661501VXC	8-Bit Addressable Latch, Rad Hard	3333
C	CD4502BDMSR	5962R9661601VEC	Strobed Hex Inverter/Buffer, Rad Hard	3334
C	CD4502BF3A	7702002EA	Strobed Hex Inverter/Buffer, Dual Brand	7012
C	CD4502BFB	JM38510/17403BEA	Strobed Hex Inverter/Buffer	-
C	CD4502BKMSR	5962R9661601VXC	Strobed Hex Inverter/Buffer, Rad Hard	3334
C	CD4503BDMSR	5962R9664301VEC	Hex Buffer, Non-Inverting, Rad Hard	3335
C	CD4503BF3A		Hex Buffer, Non-Inverting	7012
C	CD4503BKMSR	5962R9664301VXC	Hex Buffer, Non-Inverting, Rad Hard	3335
C	CD4504BDMSR	5962R9666501VEC	Hex Voltage-Level Shifter For TTL-to-CMOS or CMOS-to-CMOS, Rad Hard	3336
C	CD4504BF3A		Hex Voltage-Level Shifter For TTL-to-CMOS or CMOS-to-CMOS	7012
C	CD4504BKMSR	5962R9666501VXC	Hex Voltage-Level Shifter For TTL-to-CMOS or CMOS-to-CMOS, Rad Hard	3336
N	CD4508BD3		Dual 4-Bit Latch, Weldseal DIC	7012
C	CD4508BDMSR	5962R9668001VLC	Dual 4-Bit Latch, Rad Hard	3337

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD4508BF3A		Dual 4-Bit Latch	7012
C	CD4508BKMSR	5962R9668001VXC	Dual 4-Bit Latch, Rad Hard	3337
C	CD4510BDMSR	5962R9665701VEC	Presettable 4-Bit BCD Up/Down Counter, Rad Hard	3338
C	CD4510BF3A		Presettable Up/Down Counter	7012
C	CD4510BKMSR	5962R9665701VXC	Presettable 4-Bit BCD Up/Down Counter, Rad Hard	3338
C	CD4511BDMSR	5962R9666601VEC	BCD-to-7 Segment Latch Decoder/Driver, Rad Hard	3339
C	CD4511BF3A		BCD-to-7 Segment Latch Decoder/Driver	7012
N	CD4511BK3		BCD-to-7 Segment Latch Decoder/Driver, Field Programmable	7012
C	CD4511BKMSR	5962R9666601VXC	BCD-to-7 Segment Latch Decoder/Driver, Rad Hard	3339
C	CD4512BDMSR	5962R9666701VEC	8-Channel Data Selector, Three-State Output, Rad Hard	3340
C	CD4512BF3A		8-Channel Data Selector, Three-State Output	7012
C	CD4512BKMSR	5962R9666701VXC	8-Channel Data Selector, Three-State Output, Rad Hard	3340
C	CD4514BDMSR	5962R9668101VJC	4-Bit Latch/4-to-16 Line Decoder, Outputs Low, Rad Hard	3195
C	CD4514BF3A		4-Bit Latch/4-to-16 Line Decoder, Outputs Low	7012
C	CD4514BKMSR	5962R9668101VXC	4-Bit Latch/4-to-16 Line Decoder, Outputs Low, Rad Hard	3195
C	CD4515BDMSR	5962R9668102VJC	4-Bit Latch/4-to-16 Line Decoder, Outputs Low, Rad Hard	3195
C	CD4515BF3A	7703201JA	4-Bit Latch/4-to-16 Line Decoder, Outputs Low	7012
C	CD4515BKMSR	5962R9668102VXC	4-Bit Latch/4-to-16 Line Decoder, Outputs Low, Rad Hard	3195
C	CD4516BDMSR	5962R9665702VEC	Presettable 4-Bit Binary Up/Down Counter, Rad Hard	3338
C	CD4516BF3A		Presettable 4-Bit Binary Up/Down Counter	7012
C	CD4516BKMSR	5962R9665702VXC	Presettable 4-Bit Binary Up/Down Counter, Rad Hard	3338
C	CD4517BDMSR	5962R9666801VEC	Rad Hard Dual 64-Bit Shift Register	3341
C	CD4517BF3A		Dual 64-Bit Shift Register	7012
C	CD4517BKMSR	5962R9666801VXC	Rad Hard Dual 64-Bit Shift Register	3341
C	CD4518BDMSR	5962R9666901VEC	Rad Hard Dual BCD Up Counter	3342
C	CD4518BF3A		Dual BCD Up Counter	7012
C	CD4518BKMSR	5962R9666901VXC	Rad Hard Dual BCD Up Counter	3342
C	CD4520BDMSR	5962R9666903VEC	Rad Hard Dual Binary Up Counter	3342
C	CD4520BF3A	7702301EA	Dual Binary Up Counter, Dual Brand	7012
C	CD4520BKMSR	5962R9666903VXC	Rad Hard Dual Binary Up Counter	3342
C	CD4527BDMSR	5962R9667001VEC	Rad Hard BCD Rate Multiplier	3343
C	CD4527BKMSR	5962R9667001VXC	Rad Hard BCD Rate Multiplier	3343
C	CD4532BDMSR	5962R9667101VEC	RAd Hard 8-Input Priority Encoder	3344
C	CD4532BF3A		8-Input Priority Encoder	7012
C	CD4532BKMSR	5962R9667101VXC	Rad Hard 8-Input Priority Encoder	3344
C	CD4536BDMSR	5962R9667201VEC	Rad Hard Programmable Timer	3345
C	CD4536BF3A		Programmable Timer	7012
C	CD4536BKMSR	5962R9667201VXC	Rad Hard Programmable Time	3345
C	CD4541BF3A		Programmable Timer	7012
C	CD4555BDMSR	5962R9667301VEC	Rad Hard Dual 1-of-4 Decoder/DeMUX, Outputs High	3346
C	CD4555BF3A	7704701EA	Rad Hard Dual 1-of-4 Decoder/DeMUX, Outputs High	7012
C	CD4555BKMSR	5962R9667301VXC	Rad Hard Dual 1-of-4 Decoder/DeMUX, Outputs High	3346
C	CD4556BDMSR	5962R9667302VEC	Rad Hard Dual 1-of-4 Decoder/DeMUX, Outputs Low	3346
C	CD4556BF3A	7704801EA	Dual 1-of-4 Decoder/DeMUX, Outputs Low, Dual Brand	7012
C	CD4556BKMSR	5962R9667302VXC	Rad Hard Dual 1-of-4 Decoder/DeMUX, Outputs Low	3346
C	CD4585BDMSR	5962R9667401VEC	Rad Hard 4-Bit Magnitude Comparator	3347
C	CD4585BF3A	7703702EA	Rad Hard 4-Bit Magnitude Comparator	7012
C	CD4585BKMSR	5962R9667401VXC	Rad Hard 4-Bit Magnitude Comparator	3347
C	CD4724BDMSR	5962R9667501VEC	Rad Hard 8-Bit Addressable Latch	3348
C	CD4724BF3A		8-Bit Addressable Latch	7012

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD4724BKMSR	5962R9667501VXC	Rad Hard 8-Bit Addressable Latch	3348
C	CD4001BDNSR	5962R9582605VCC	Quad 2-Input NOR Gate, Rad Hard, w/Neutron	3289
C	CD4001BKNSR	5962R9582605VXC	Quad 2-Input NOR Gate, Rad Hard, w/Neutron	3289
C	CD4002BKNSR	5962R9582606VXC	Dual 4-Input NOR Gate, Rad Hard, w/Neutron	3289
C	CD4006BDNSR	5692R9661702VCC	18-Stage Static Shift Register, Rad Hard, w/Neutron	3290
C	CD4006BKNSR	5692R9661702VXC	18-Stage Static Shift Register, Rad Hard, w/Neutron	3290
C	CD4008BKNSR	5962R9661902VXC	4-Bit Full Adder w/Parallel Carry Out, Rad Hard,w/Neutron	3292
C	CD4008BDNSR	5962R9661902VEC	4-Bit Full Adder w/Parallel Carry Out, Rad Hard,w/Neutron	3292
C	CD40105BDNSR	5962R9660202VEC	FIFO Register, Rad Hard, w/Neutron	3353
C	CD40105BKNSR	5962R9660202VXC	FIFO Register, Rad Hard, w/Neutron	3353
C	CD40106BDNSR	5962R9660302VCC	Hex Schmitt Trigger, Rad Hard, w/Neutron	3354
C	CD40106BKNSR	5962R9660302VXC	Hex Schmitt Trigger, Rad Hard, w/Neutron	3354
C	CD40107BDNSR	5962R9664402VCC	Dual 2-Input NAND Buffer/Driver, Rad Hard, w/Neutron	3355
C	CD40107BKNSR	5962R9664402VXC	Dual 2-Input NAND Buffer/Driver, Rad Hard, w/Neutron	3355
C	CD40109BKNSR	5962R9664502VXC	Quad Low-to-High Voltage Shifter, Rad Hard, w/Neutron	3196
C	CD40109BDNSR	5962R9664502VEC	Quad Low-to-High Voltage Shifter, Rad Hard, w/Neutron	3196
C	CD4011BKNSR	5962R9662104VXC	NAND Gates, Rad Hard, w/Neutron	3079
C	CD4011BDNSR	5962R9662104VCC	NAND Gates, Rad Hard, w/Neutron	3079
C	CD4012BDNSR	5962R9662105VCC	NAND Gates, Rad Hard, w/Neutron	3079
C	CD4012BKNSR	5962R9662105VXC	NAND Gates, Rad Hard, w/Neutron	3079
C	CD4013BDNSR	5962R9662202VCC	Dual D-Type Flip Flop, Rad Hard, w/Neutron	3080
C	CD4013BKNSR	5962R9662202VXC	Dual D-Type Flip Flop, Rad Hard, w/Neutron	3080
C	CD4014BDNSR	5962R9662303VEC	8-Stage Static Shift Register, Rad Hard, w/Neutron	3294
C	CD4014BKNSR	5962R9662303VXC	8-Stage Static Shift Register, Rad Hard, w/Neutron	3294
C	CD4015BKNSR	5962R9662402VXC	Dual 4-Stage Static Shift Reg, Ser.In/Par.Out, Rad Hard, w/Neu.	3295
C	CD4015BDNSR	5962R9662402VEC	Dual 4-Stage Static Shift Reg, Ser.In/Par.Out, Rad Hard, w/Neu.	3295
C	CD40161BKNSR	5962R9667605VXC	Synchronous Prog. 4-Bit Counter, Rad Hard, w/Neutron	3358
C	CD40161BDNSR	5962R9667605VEC	Synchronous Prog. 4-Bit Counter, Rad Hard, w/Neutron	3358
C	CD40174BDNSR	5962R9660502VEC	Hex D-Type Flip Flop, Rad Hard, w/Neutron	3359
C	CD40174BKNSR	5962R9660502VXC	Hex D-Type Flip Flop, Rad Hard, w/Neutron	3359
C	CD4017BKNSR	5962R9662503VXC	Counter/Dividers, Rad Hard, w/Neutron	3297
C	CD4017BDNSR	5962R9662503VEC	Counter/Dividers, Rad Hard, w/Neutron	3297
C	CD4019BKNSR	5962R9662702VXC	Quad AND/OR Select Gate, Rad Hard, w/Neutron	3299
C	CD4019BDNSR	5962R9662702VEC	Quad AND/OR Select Gate, Rad Hard, w/Neutron	3299
C	CD4020BDNSR	5962R9662802VEC	Ripple Carry Binary Counter/Dividers, Rad Hard, w/Neutron	3300
C	CD4020BKNSR	5962R9662802VYC	Ripple Carry Binary Counter/Dividers, Rad Hard, w/Neutron	3300
C	CD4021BDNSR	5962R9662304VEC	8-Stage Static Shift Register, Rad Hard,w/Neutron	3294
C	CD4021BKNSR	5962R9662304VXC	8-Stage Static Shift Register, Rad Hard,w/Neutron	3294
C	CD4022BDNSR	5962R9662504VEC	Counter/Dividers, Rad Hard, w/Neutron	3297
C	CD4022BKNSR	5962R9662504VXC	Counter/Dividers, Rad Hard, w/Neutron	3297
C	CD4023BDNSR	5962R9662106VCC	NAND Gates, rad Hard, w/Neutron	3079
C	CD4023BKNSR	5962R9662106VXC	NAND Gates, rad Hard, w/Neutron	3079
C	CD4024BDNSR	5962R9662804VCC	Ripple Carry Binary Counter/Dividers, Rad Hard, w/Neutron	3300
C	CD4024BKNSR	5962R9662804VXC	Ripple Carry Binary Counter/Dividers, Rad Hard, w/Neutron	3300
C	CD40257BKNSR	5962R9667702VXC	Quad 2 Line to 1 Line Data Selector/Mux, Rad Hard, w/Neutron	3364
C	CD40257BDNSR	5962R9667702VEC	Quad 2 Line to 1 Line Data Selector/Mux, Rad Hard, w/Neutron	3364
C	CD4025BKNSR	5962R9582607VXC	NOR Gates, rad Hard, w/Neutron	3289
C	CD4025BDNSR	5962R9582607VCC	NOR Gates, rad Hard, w/Neutron	3289
C	CD4027BKNSR	5962R9662902VXC	Dual J-K Master Slave Flip Flop, Rad Hard, w/Neutron	3302
C	CD4027BDNSR	5962R9662902VEC	Dual J-K Master Slave Flip Flop, Rad Hard, w/Neutron	3302

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD4028BKNSR	5962R9663002VXC	BCD-to-Decimal Decoder, Rad Hard, w/Neutron	3303
C	CD4028BDNSR	5962R9663002VEC	BCD-to-Decimal Decoder, Rad Hard, w/Neutron	3303
C	CD4029BKNSR	5962R9562102VXC	Presettable Up/Down Counter, Rad Hard, w/Neutron	3304
C	CD4029BDNSR	5962R9562102VEC	Presettable Up/Down Counter, Rad Hard, w/Neutron	3304
C	CD4030BDNSR	5962R9664602VCC	Quad Exclusive OR Gate, Rad Hard, w/Neutron	3305
C	CD4030BKNSR	5962R9664602VXC	Quad Exclusive OR Gate, Rad Hard, w/Neutron	3305
C	CD4031BKNSR	5962R9664702VXC	64-Stage Shift Register, Rad Hard, w/Neutron	3306
C	CD4031BDNSR	5962R9664702VEC	64-Stage Shift Register, Rad Hard, w/Neutron	3306
C	CD4034BKNSR	5962R9667802VXC	8-Stage Static Bi-direct. Par./Ser I/O Bus Reg, RH, w/Neutron	3307
C	CD4034BDNSR	5962R9667802VJC	8-Stage Static Bi-direct. Par./Ser I/O Bus Reg, RH, w/Neutron	3307
C	CD4035BKNSR	5962R9664902VXC	4-Stage Parallel I/O Shift Register, Rad Hard, w/Neutron	3308
C	CD4035BDNSR	5962R9664902VEC	4-Stage Parallel I/O Shift Register, Rad Hard, w/Neutron	3308
C	CD4040BKNSR	5962R9662806VYC	Ripple Carry Binary Counter/Dividers, Rad Hard, w/Neutron	3300
C	CD4040BDNSR	5962R9662806VEC	Ripple Carry Binary Counter/Dividers, Rad Hard, w/Neutron	3300
C	CD4041UBKNSR	5962R9663202VXC	Quad True/Compliment Buffer, Rad Hard, w/Neutron	3309
C	CD4041UBDNSR	5962R9663202VCC	Quad True/Compliment Buffer, Rad Hard, w/Neutron	3309
C	CD4042BKNSR	5962R9663302VXC	Quad Clocked D Latch, Rad Hard, w/Neutron	3310
C	CD4042BDNSR	5962R9663302VEC	Quad Clocked D Latch, Rad Hard, w/Neutron	3310
C	CD4043BDNSR	5962R9663403VEC	Quad 3-State R/S Latches, Rad Hard, w/Neutron	3311
C	CD4043BKNSR	5962R9663403VXC	Quad 3-State R/S Latches, Rad Hard, w/Neutron	3311
C	CD4046BDNSR	5962R9666402VEC	Micropower Phase Locked Loop, Rad Hard, w/Neutron	3312
C	CD4046BKNSR	5962R9666402VXC	Micropower Phase Locked Loop, Rad Hard, w/Neutron	3312
C	CD4047BDNSR	5962R9663502VCC	Low Power Monostable/Astable Multivibrator, RH, w/Neutron	3313
C	CD4047BKNSR	5962R9663502VXC	Low Power Monostable/Astable Multivibrator, RH, w/Neutron	3313
C	CD4049UBDNSR	5962R9663602VEC	Inverting Hex Buffer/Converter, Rad Hard, w/Neutron	3315
C	CD4049UBKNSR	5962R9663602VXC	Inverting Hex Buffer/Converter, Rad Hard, w/Neutron	3315
C	CD4050BKNSR	5962R9663702VXC	Non-Inverting Hex Buffer/Converter, Rad Hard, w/Neutron	3193
C	CD4050BDNSR	5962R9663702VEC	Non-Inverting Hex Buffer/Converter, Rad Hard, w/Neutron	3193
C	CD4051BKNSR	5962R9665104VXC	Analog Multiplexers/Demultiplexers, Rad Hard, w/Neutron	3316
C	CD4051BDNSR	5962R9665104VEC	Analog Multiplexers/Demultiplexers, Rad Hard, w/Neutron	3316
C	CD4052BDNSR	5962R9665105VEC	Analog Multiplexers/Demultiplexers, Rad Hard, w/Neutron	3316
C	CD4052BKNSR	5962R9665105VXC	Analog Multiplexers/Demultiplexers, Rad Hard, w/Neutron	3316
C	CD4053BKNSR	5962R9665106VXC	Analog Multiplexers/Demultiplexers, Rad Hard, w/Neutron	3316
C	CD4053BDNSR	5962R9665106VEC	Analog Multiplexers/Demultiplexers, Rad Hard, w/Neutron	3316
C	CD4066BKNSR	5962R9665202VXC	Quad Bilateral Switch, Rad Hard, w/Neutron	3319
C	CD4066BDNSR	5962R9665202VCC	Quad Bilateral Switch, Rad Hard, w/Neutron	3319
C	CD4068BDNSR	5962R9661002VCC	8-Input NAND/AND Gate, Rad Hard, w/Neutron	3320
C	CD4068BKNSR	5962R9661002VXC	8-Input NAND/AND Gate, Rad Hard, w/Neutron	3320
C	CD4069UBKNSR	5962R9665302VXC	Hex Inverter, Rad Hard, w/Neutron	3321
C	CD4069UBDNSR	5962R9665302VCC	Hex Inverter, Rad Hard, w/Neutron	3321
C	CD4070BDNSR	5962R9661103VCC	Quad Exclusive OR and Exclusive NOR Gates, RH, w/Neutron	3322
C	CD4070BKNSR	5962R9661103VXC	Quad Exclusive OR and Exclusive NOR Gates, RH, w/Neutron	3322
C	CD4071BDNSR	5962R9665402VCC	OR Gates, Rad Hard, w/Neutron	3323
C	CD4071BKNSR	5962R9665402VXC	OR Gates, Rad Hard, w/Neutron	3323
C	CD4072BDNSR	5962R9665404VCC	OR Gates, Rad Hard, w/Neutron	3323
C	CD4072BKNSR	5962R9665404VXC	OR Gates, Rad Hard, w/Neutron	3323
C	CD4073BKNSR	5962R9665504VXC	AND Gates, Rad Hard, w/Neutron	3324
C	CD4073BDNSR	5962R9665504VCC	AND Gates, Rad Hard, w/Neutron	3324
C	CD4075BDNSR	5962R9665406VCC	OR Gates, Rad Hard, w/Neutron	3323
C	CD4075BKNSR	5962R9665406VXC	OR Gates, Rad Hard, w/Neutron	3323

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD4076BDNSR	5962R9665602VEC	4-Bit D-Type Registers, Rad Hard, w/Neutron	3325
C	CD4076BKNSR	5962R9665602VXC	4-Bit D-Type Registers, Rad Hard, w/Neutron	3325
C	CD4077BKNSR	5962R9661104VXC	Quad Eclusive OR and Eclusive NOR Gates, RH, w/Neutron	3322
C	CD4077BDNSR	5962R9661104VCC	Quad Eclusive OR and Eclusive NOR Gates, RH, w/Neutron	3322
C	CD4078BKNSR	5962R9663802VXC	8 Input NOR/OR Gate, Rad Hard, w/Neutron	3326
C	CD4078BDNSR	5962R9663802VCC	8 Input NOR/OR Gate, Rad Hard, w/Neutron	3326
C	CD4081BDNSR	5962R9665505VCC	AND Gates, Rad Hard, w/Neutron	3324
C	CD4081BKNSR	5962R9665505VXC	AND Gates, Rad Hard, w/Neutron	3324
C	CD4082BDNSR	5962R9665506VCC	AND Gates, Rad Hard, w/Neutron	3324
C	CD4082BKNSR	5962R9665506VXC	AND Gates, Rad Hard, w/Neutron	3324
C	CD4093BKNSR	5962R9664102VXC	Quad 2-Input NAND Schmitt Triggers, Rad Hard, w/Neutron	3330
C	CD4093BDNSR	5962R9664102VCC	Quad 2-Input NAND Schmitt Triggers, Rad Hard, w/Neutron	3330
C	CD4094BDNSR	5962R9664202VEC	8-Stage Shift and Store Bus Register, Rad Hard, w/Neutron	3194
C	CD4094BKNSR	5962R9664202VXC	8-Stage Shift and Store Bus Register, Rad Hard, w/Neutron	3194
C	CD4098BKNSR	5962R9661402VXC	Dual Monostable Multivibrator, Rad Hard, w/Neutron	3332
C	CD4098BDNSR	5962R9661402VEC	Dual Monostable Multivibrator, Rad Hard, w/Neutron	3332
C	CD4502BDNSR	5962R9661602VEC	Strobed Hex Inverter, Rad Hard, w/Neutron	3334
C	CD4502BKNSR	5962R9661602VXC	Strobed Hex Inverter, Rad Hard, w/Neutron	3334
C	CD4503BDNSR	5962R9664301VEC	Hex Buffer, Rad Hard, w/Neutron	3335
C	CD4503BKNSR	5962R9664301VXC	Hex Buffer, Rad Hard, w/Neutron	3335
C	CD4508BKNSR	5962R9668002VXC	Dual 4-Bit Latch, Rad Hard, w/Neutron	3337
C	CD4508BDNSR	5962R9668002VLC	Dual 4-Bit Latch, Rad Hard, w/Neutron	3337
C	CD4512BDNSR	5962R9666702VEC	8-Channel Data Selector, Three-State Outputs, RH, w/Neutron	3340
C	CD4512BKNSR	5962R9666702VXC	8-Channel Data Selector, Three-State Outputs, RH, w/Neutron	3340
C	CD4514BDNSR	5962R9668103VJC	4-Bit Latch/4-to-16 Line Decoder, Rad Hard, w/Neutron	3195
C	CD4514BKNSR	5962R9668103VXC	4-Bit Latch/4-to-16 Line Decoder, Rad Hard, w/Neutron	3195
C	CD4515BKNSR	5962R9668104VXC	4-Bit Latch/4-to-16 Line Decoder, Rad Hard, w/Neutron	3195
C	CD4515BDNSR	5962R9668104VJC	4-Bit Latch/4-to-16 Line Decoder, Rad Hard, w/Neutron	3195
C	CD4516BDNSR	5962R9665703VEC	Presettable Up/Down Counters, Rad Hard, w/Neutron	3338
C	CD4516BKNSR	5962R9665703VXC	Presettable Up/Down Counters, Rad Hard, w/Neutron	3338
C	CD4520BDNSR	5962R9666903VEC	Dual Up Counters, Rad Hard, w/Neutron	3342
C	CD4520BKNSR	5962R9666903VXC	Dual Up Counters, Rad Hard, w/Neutron	3342
C	CD4532BDNSR	5962R9667102VEC	8-Bit Priority Encoder, Rad Hard, w/Neutron	3344
C	CD4532BKNSR	5962R9667102VXC	8-Bit Priority Encoder, Rad Hard, w/Neutron	3344
C	CD4555BDNSR	5962R9667303VEC	Dual Binary to 1 of 4 Decoder/Demultiplexer, RH, w/Neutron	3346
C	CD4555BKNSR	5962R9667303VXC	Dual Binary to 1 of 4 Decoder/Demultiplexer, RH, w/Neutron	3346
C	CD4556BDNSR	5962R9667304VEC	Dual Binary to 1 of 4 Decoder/Demultiplexer, RH, w/Neutron	3346
C	CD4556BKNSR	5962R9667304VXC	Dual Binary to 1 of 4 Decoder/Demultiplexer, RH, w/Neutron	3346
C	CD54AC00F3A		Quad 2-Input NAND Gate	3876
C	CD54AC02F3A		Quad 2-Input NOR Gate	3877
C	CD54AC04F3A		Hex Inverter/Buffer	3878
C	CD54AC05F3A		Hex Inverter/Buffer with Open Drain	3879
C	CD54AC08F3A		Quad 2-Input AND Gate	3880
C	CD54AC109F3A		Dual J-K Flip-Flop with Set and Reset +Trigger	3885
C	CD54AC112F3A		Dual J-K Flip-Flop with Set and Reset -Trigger	3886
C	CD54AC138F3A		3-to-8 Decoder/DeMUX, Inverting	3887
C	CD54AC139F3A		Dual 2-to-4 Line Decoder/DeMUX	3888
C	CD54AC153F3A		Dual 4-Input MUX	3890
C	CD54AC157F3A		Quad 2-Input MUX	3891
C	CD54AC161F3A		Presettable Synchronous 4-Bit Counter, Asynchronous Reset	3892

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD54AC163F3A		Presettable Synchronous 4-Bit Counter, Synchronous Reset	3893
C	CD54AC164F3A		8-Bit Serial In/Parallel Out Shift Register	3894
C	CD54AC191F3A		Presettable Synchronous 4-Bit Up/Down Counter	3896
C	CD54AC193F3A		Presettable Synchronous 4-Bit Up/Down Counter	3897
C	CD54AC240F3A		Octal Buffer/Line Driver, Three-State Inverting	3898
C	CD54AC244F3A		Octal Buffer/Line Driver, Three-State	3900
C	CD54AC245F3A		Octal Transceiver, Three-State	3901
C	CD54AC257F3A		Quad 2-Input MUX, Three-State, Non-Inverting	3903
C	CD54AC273F3A		Octal D Flip-Flop with Reset, +Trigger	3904
C	CD54AC280F3A		9-Bit Odd/Even Parity Generator Checker	3905
C	CD54AC283F3A		4-Bit Full Adder with Fast Carry	3906
C	CD54AC299F3A		8-Bit Shift/Storage Register Three-State, Asynchronous Reset	3907
C	CD54AC32F3A		Quad 2-Input OR Gate	3882
C	CD54AC373F3A		Octal Transparent Latch, Three-State	3909
C	CD54AC374F3A		Octal D Type Flip-Flop, with +Trigger	3910
C	CD54AC534F3A		Octal D Type Flip-Flop, with +Trigger Inverting	3912
C	CD54AC541F3A		Octal Buffer/Line Driver, Three-State	3914
C	CD54AC573F3A		Octal Transparent Latch, Three-State	3915
C	CD54AC574F3A		Octal D Type Flip-Flop, with +Trigger	3916
C	CD54AC74F3A		Dual D Flip-Flop, with S and R, +Trigger	3883
C	CD54ACT00F3A		Quad 2-Input NAND Gate	3876
C	CD54ACT02F3A		Quad 2-Input NOR Gate	3877
C	CD54ACT04F3A		Hex Inverter/Buffer	3878
C	CD54ACT05F3A		Hex Inverter/Buffer with Open Drain	3879
C	CD54ACT08F3A		Quad 2-Input AND Gate	3880
C	CD54ACT109F3A		Dual J-K Flip-Flop with Set and Reset +Trigger	3885
C	CD54ACT112F3A		Dual J-K Flip-Flop with Set and Reset -Trigger	3886
C	CD54ACT138F3A		3-to-8 Decoder/DeMUX, Inverting	3887
C	CD54ACT139F3A		Dual 2-to-4 Line Decoder/DeMUX	3888
C	CD54ACT151F3A		8 Input MUX	3889
C	CD54ACT153F3A		Dual 4-Input MUX	3890
C	CD54ACT161F3A		Presettable Synchronous 4-Bit Counter, Asynchronous Reset	3892
C	CD54ACT163F3A		Presettable Synchronous 4-Bit Counter, Synchronous Reset	3893
C	CD54ACT164F3A		8-Bit Serial In/Parallel Out Shift Register	3894
C	CD54ACT174F3A		Hex D Type Flip-Flop, with Reset +Trigger	3895
C	CD54ACT191F3A		Presettable Synchronous 4-Bit Up/Down Counter	3896
C	CD54ACT193F3A		Presettable Synchronous 4-Bit Up/Down Counter	3897
C	CD54ACT20F3A		Dual 4-Input NAND Gate	3881
C	CD54ACT240F3A		Octal Buffer/Line Driver, Three-State Inverting	3898
C	CD54ACT241F3A		Octal Buffer/Line Driver, Three-State	3899
C	CD54ACT244F3A		Octal Buffer/Line Driver, Three-State	3900
C	CD54ACT245F3A		Octal Transceiver, Three-State	3901
C	CD54ACT253F3A		Dual 4-Input MUX, Three-State	3902
C	CD54ACT257F3A		Quad 2-Input MUX, Three-State, Non-Inverting	3903
C	CD54ACT273F3A		Octal D Flip-Flop with Reset, +Trigger	3904
C	CD54ACT280F3A		9-Bit Odd/Even Parity Generator Checker	3905
C	CD54ACT283F3A		4-Bit Full Adder with Fast Carry	3906
C	CD54ACT299F3A		8-Bit Shift/Storage Register Three-State, Asynchronous Reset	3907
C	CD54ACT323F3A		8-Bit Shift/Storage Register Three-State, Synchronous Reset	3908
C	CD54ACT32F3A		Quad 2-Input OR Gate	3882

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD54ACT373F3A		Octal Transparent Latch, Three-State	3909
C	CD54ACT374F3A		Octal D Type Flip-Flop, with +Trigger	3910
C	CD54ACT533F3A		Octal Transparent Latch, Three-State, Inverting	3911
C	CD54ACT534F3A		Octal D Type Flip-Flop, with +Trigger Inverting	3912
C	CD54ACT540F3A		Octal Buffer/Line Driver, Three-State	3913
C	CD54ACT541F3A		Octal Buffer/Line Driver, Three-State	3914
C	CD54ACT573F3A		Octal Transparent Latch, Three-State	3915
C	CD54ACT574F3A		Octal D Type Flip-Flop, with +Trigger	3916
C	CD54ACT623F3A		Octal Bus Transceiver, Three-State	3917
C	CD54ACT74F3A		Dual D Flip-Flop, with S and R, +Trigger	3883
C	CD54ACT86F3A		Quad 2-Input Exclusive OR Gate	3884
C	CD54HC00F3A	8403701CA	Quad 2-Input NAND Gate, Dual Brand	3753
C	CD54HC02F3A	8404101CA	Quad 2-Input NOR Gate, Dual Brand	3754
C	CD54HC03F3A	8409801CA	Quad 2-Input NAND Gate, Open Co, Dual Brand	3755
C	CD54HC04F3A	8409301CA	Hex Inverter/Buffer, Dual Brand	3756
C	CD54HC08F3A	8404701CA	Quad 2-Input AND Gate, Dual Brand	3757
C	CD54HC107F3A	5962-8515401CA	Dual J-K Flip-Flop with Reset, Dual Brand	3772
C	CD54HC109F3A	8415001EA	Dual J-K Flip-Flop with Set Reset, Dual Brand	3773
C	CD54HC10F3A	8403801CA	Triple 3-Input NAND Gate, Dual Brand	3758
C	CD54HC11F3A	8404801CA	Triple 3-Input AND Gate, Dual Brand	3759
C	CD54HC123F3A	5962-8684701EA	Dual Retriggerable Monostable. Multivibrator, Dual Brand	3775
C	CD54HC125F3A	5962-8772101CA	Quad Three-State Buffer, Dual Brand	3776
C	CD54HC126F3A	5962-8684801CA	Quad Three-State Buffer, Dual Brand	3777
C	CD54HC132F3A		Quad 2-Input NAND Schmitt Trigger	3778
C	CD54HC138F3A	8406201EA	3-to-8 Line Decoder/DeMUX, Inverting, Dual Brand	3779
C	CD54HC147F3A	8406401EA	10-to-4 Line Priority Encoder, Dual Brand	3781
C	CD54HC14F3A	8409101CA	Hex Inverting Schmitt Trigger, Dual Brand	3760
C	CD54HC154F3A	5962-8682201JA	4-to-16 Line Decoder, Dual Brand	3784
C	CD54HC157F3A	5962-8606101EA	Quad 2-Input MUX, Dual Brand	3785
C	CD54HC158F3A	5962-8682301EA	Quad 2-Input MUX, Inverting, Dual Brand	3786
C	CD54HC160F3A	5962-8682401EA	Synchronous BCD Decade Counter, Dual Brand	3787
C	CD54HC161F3A	8407501EA	Synchronous Presettable 4-Bit Counter, Dual Brand	3788
C	CD54HC162F3A	8409401EA	Synchronous BCD Decade Counter, Dual Brand	3789
C	CD54HC163F3A	8604601EA	Synchronous Presettable 4-Bit Counter, Dual Brand	3790
C	CD54HC164F3A	8416201CA	8-Bit Serial In/Parallel Out Shift Register, Dual Brand	3791
C	CD54HC165F3A	8409501EA	8-Bit Parallel In/Serial Out Shift Register, Dual Brand	3792
C	CD54HC166F3A		8-Bit Parallel Shift Register	3793
C	CD54HC173F3A	5962-8682501EA	Quad D-Type Flip-Flop, Dual Brand	3794
C	CD54HC190F3A	5962-8994601EA	Presettable Synchronous BCD Up/Down Counter, Dual Brand	3797
C	CD54HC191F3A	5962-8689101EA	Synchronous 4-Bit Binary Up/Down Counter, Dual Brand	3798
C	CD54HC192F3A	5962-8780801EA	Synchronous BCD Decade U/D Counter, Dual Brand	3799
C	CD54HC193F3A	5962-8772401EA	Synchronous 4-Bit Binary U/D Counter, Dual Brand	3800
C	CD54HC194F3A	5962-8682601EA	4-Bit Bidirectional Universal Shift Register, Dual Brand	3801
C	CD54HC21F3A	5962-8857601CA	Dual 4-Input AND Gate, Dual Brand	3762
C	CD54HC221F3A	5962-8780501EA	Dual Monostable Multivibrator with Reset, Dual Brand	3803
C	CD54HC238F3A	5962-8688401EA	3-to-8 Line Decoder/DeMUX, Dual Brand	3805
C	CD54HC240F3A	8407401RA	Octal Buffer/Line Driver Three-State, Dual Brand	3806
C	CD54HC243F3A	8409001CA	Quad Bus Transceiver, Three-State, Dual Brand	3808
C	CD54HC244F3A	8409001CA	Octal Buffer/Line Driver, Three-State, Dual Brand	3809
C	CD54HC245F3A	8408501RA	Octal Bus Transceiver, Three-State, Dual Brand	3810

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD54HC251F3A	8512501EA	8-Input MUX, Three-State, Dual Brand	3811
C	CD54HC253F3A		Dual 4-Input MUX, Three-State	3812
C	CD54HC257F3A	8512401EA	Quad 2-Input MUX, Three-State, Dual Brand	3813
C	CD54HC259F3A	8551901EA	8-Bit Addressable Hatch, Dual Brand	3815
C	CD54HC273F3A	8409901RA	Octal D-Type Flip-Flop with Reset, Dual Brand	3816
C	CD54HC27F3A	8404201CA	Triple 3-Input NOR Gate, Dual Brand	3763
C	CD54HC280F3A	8607701CA	9-Bit Odd/Even Parity Generator Checker, Dual Brand	3817
C	CD54HC283F3A	5962-8976501EA	4-Bit Binary Full Adder with Fast C., Dual Brand	3818
C	CD54HC299F3A	5962-8780601RA	8-Bit Universal Shift Register, Three-State, Dual Brand	3820
C	CD54HC30F3A	8404001CA	8-Input NAND Gate, Dual Brand	3764
C	CD54HC32F3A	8404501CA	Quad 2-Input OR Gate, Dual Brand	3765
C	CD54HC354F3A		8-Input MUX, Latched-Data, Three-State	3821
C	CD54HC356F3A		8-Input MUX, Clock-Latched-Data, Three-State	3822
C	CD54HC365F3A	8500101EA	Hex Buffer/Line Driver, Three-State, Dual Brand	3823
C	CD54HC366F3A	5962-8682801EA	Hex Buffer/Line Driver, Three-State, Inverting, Dual Brand	3824
C	CD54HC367F3A	8500201EA	Hex Buffer/Line Driver, Three-State, Dual Brand	3825
C	CD54HC368F3A	5962-8681201EA	Hex Buffer/Line Driver, Three-State, Inverting, Dual Brand	3826
C	CD54HC373F3A	8407201RA	Octal Transparent Latch, Three-State, Dual Brand	3827
C	CD54HC374F3A	8407101RA	Octal D-Type Flip-Flop, Three-State, Dual Brand	3828
C	CD54HC377F3A	5962-8780701RA	Octal D-Type Flip-Flop. with Data Enable, Dual Brand	3829
C	CD54HC393F3A	8410001CA	Dual 4-Bit Binary Ripple Counter, Dual Brand	3831
C	CD54HC40103F3A	5962-9055301EA	8-Bit Binary Down Counter, Dual Brand	3873
C	CD54HC40105F3A		4-Bit Binary 16 Word FIFO Register	3874
C	CD54HC4015F3A	5962-8995301EA	Dual Brand DESC	3847
C	CD54HC4017F3A	8601101EA	Johnson Decade Counter, with 10 Outputs, Dual Brand	3848
C	CD54HC4020F3A	8500301EA	14-Stage Binary Ripple Counter, Dual Brand	3849
C	CD54HC4024F3A	8601201CA	7-Stage Binary Ripple Counter, Dual Brand	3850
C	CD54HC4040F3A	8500401EA	12-Bit Binary Ripple Counter, Dual Brand	3851
C	CD54HC4046AF3A	5962-8960901EA	Phase-Locked Loop with VCO, Dual Brand	3852
C	CD54HC4049F3A	5962-8681901EA	Hex Inverting High-to-Low Level Shift, Dual Brand	3853
C	CD54HC4050F3A	5962-8682001EA	Hex High-to-Low Level Shifter, Dual Brand	3854
C	CD54HC4051F3A		8-Channel Analog MUX/DeMUX	3855
C	CD54HC4052F3A	5962-8855601EA	Dual 4-Channel Analog MUX/DeMUX, Dual Brand	3856
C	CD54HC4053F3A	5962-8775401EA	Triple 2-Channel Analog MUX/DeMUX, Dual Brand	3857
C	CD54HC4060F3A	5962-8768001EA	14-Stage Binary Ripple Counter, Dual Brand	3859
C	CD54HC4066F3A		Quad Bilateral Switch	3860
C	CD54HC4094F3A		8-Stage Shift-and-Store Bus Register	3862
C	CD54HC4316F3A		Quad Analog Switch	3863
C	CD54HC4351F3A		Analog MUX with Latch	3864
C	CD54HC4511F3A	5962-8773301EA	BCD-To-7 Segment Latch/Decoder/Driver, Dual Brand	3865
C	CD54HC4514F3A		4-to-16 Line Decoder/DeMUX with Input Latch	3866
C	CD54HC4515F3A		4-to-16 Line Decoder with Input Latch	3867
C	CD54HC4516F3A		Up/Down Binary Counter	3868
C	CD54HC4520F3A	5962-8995401EA	Dual Up-Counter, Dual Brand	3869
C	CD54HC4538F3A	5962-8688601EA	Dual Retriggerable Precision Mono.Multivibrator, Dual Brand	3870
C	CD54HC533F3A	5962-8681301RA	Octal Transparent Latch, Three-State, Dual Brand	3833
C	CD54HC534F3A	5962-8681401RA	Octal D-Type Flip-Flop, Three-State, Dual Brand	3834
C	CD54HC540F3A		Octal Buffer/Line Driver Three-State, Inverting	3835
C	CD54HC541F3A		Octal Buffer/Line Driver, Three-State	3836
C	CD54HC563F3A	5962-8606201RA	Octal Transparent Latch, Three-State, Dual Brand	3837

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD54HC564F3A	5962-8681501RA	Octal D-Type Flip-Flop, Three-State, Dual Brand	3838
C	CD54HC573F3A	8512801RA	Octal Transparent Latch, Three-State, Dual Brand	3839
C	CD54HC574F3A		Octal D Flip-Flop, Three-State	3840
C	CD54HC597F3A	5962-8681701EA	8-Bit Shift Ref. with I/P Latch, Dual Brand	3841
C	CD54HC640F3A	5962-8780901RA	Octal Bus Transceiver, Three-State Inverting, Dual Brand	3842
C	CD54HC646F3A	5962-8688501JA	Octal Bus Transceiver/Register, Three-State, Dual Brand	3843
C	CD54HC670F3A		4 x 4 Register File, Three-State	3844
C	CD54HC688F3A	5962-8681801RA	8-Bit Magnitude Comparator, Dual Brand	3845
C	CD54HC7266F3A	8404302CA	Quad Exclusive NOR, Dual Brand	3871
C	CD54HC73F3A	5962-8515301CA	Dual J-K Flip-Flop with Reset, Dual Brand	3767
C	CD54HC74F3A	8405601CA	Dual D Flip-Flop with Set and Reset, Dual Brand	3768
C	CD54HC75F3A	8407001EA	Quad Bistable Transparent Latch, Dual Brand	3769
C	CD54HC85F3A	8601301EA	4-Bit Magnitude Comparator, Dual Brand	3770
C	CD54HC86F3A	8404601CA	Quad 2-Input Exclusive OR Gate, Dual Brand	3771
C	CD54HCT00F3A	5962-8683101CA	Quad 2-Input NAND Gate, Dual Brand	3753
C	CD54HCT02F3A	5962-8975101CA	Quad 2-Input NAND Gate, Dual Brand	3754
C	CD54HCT03F3A		Quad 2-Input NAND, Open Collector	3755
C	CD54HCT04F3A	5962-8974701CA	Hex Inverter, Dual Brand	3756
C	CD54HCT08F3A	5962-8688301CA	Quad 2-Input AND Gate, Dual Brand	3757
C	CD54HCT109F3A	5962-9070101MEA	Dual J-K Flip-Flop with Set and Reset, Dual Brand	3773
C	CD54HCT10F3A	5962-8984301CA	Triple 3-Input NAND Gate, Dual Brand	3758
C	CD54HCT112F3A	5962-8970201EA	Dual J-K Flip-Flop with Set and Reset, Dual Brand	3774
C	CD54HCT11F3A	5962-8970901CA	Triple 3-Input AND Gate, Dual Brand	3759
C	CD54HCT123F3A	5962-8970001EA	Dual Retriggerable Monostable Multivibrator, Dual Brand	3775
C	CD54HCT125F3A		Quad Three-State Buffer	3776
C	CD54HCT126F3A	5962-9065101MCA	Quad Three-State Buffer, Dual Brand	3777
C	CD54HCT132F3A	5962-8984501CA	Quad 2-Input NAND Schmitt Trigger, Dual Brand	3778
C	CD54HCT138F3A	8550401EA	3-to-8-Line Decoder/DeMUX, Inverter, Dual Brand	3779
C	CD54HCT139F3A		Dual 1 of 4 Decoder/MUX	3780
C	CD54HCT14F3A	5962-8689001CA	Hex Inverting Schmitt Trigger, Dual Brand	3760
C	CD54HCT151F3A	5962-9065201MEA	8-Input MUX, Dual Brand	3782
C	CD54HCT153F3A	5962-9050501MEA	Dual 4-Input MUX, Dual Brand	3783
C	CD54HCT154F3A	5962-8670101JA	4-to-16-Line Decoder/DeMUX, Dual Brand	3784
C	CD54HCT157F3A	5962-9070201MEA	Quad 2-Input MUX, Dual Brand	3785
C	CD54HCT161F3A	5962-8685401EA	Synchronous 4-Bit Binary Counter, Dual Brand	3788
C	CD54HCT162F3A		Synchronous 4-Bit Binary Counter, Synchronous Reset	3789
C	CD54HCT163F3A	5962-8970401CA	8-Bit Serial-In/Parallel-Out Shift Register, Dual Brand	3790
C	CD54HCT164F3A	5962-8685501EA	8-Bit Parallel-In/Serial-Out Shift Register, Dual Brand	3791
C	CD54HCT165F3A		8-Bit Parallel-In/Serial-Out Shift Register	3792
C	CD54HCT166F3A	5962-8875901EA	Quad D-Type Flip-Flop, Three-State, Dual Brand	3793
C	CD54HCT173F3A	5962-8974301EA	Hex D-Type Flip-Flop, Three-State, Dual Brand	3794
C	CD54HCT174F3A	5962-8970101EA	Quad D-Type Flip-Flop with Reset, Dual Brand	3795
C	CD54HCT191F3A	5962-8867101EA	Synchronous 4-Bit Binary Up/Down Counter, Dual Brand	3798
C	CD54HCT193F3A	5962-9084801MEA	Synchronous 4-Bit Binary Up/Down Counter, Dual Brand	3800
C	CD54HCT20F3A		Dual 4-Input NAND Gate	3761
C	CD54HCT238F3A	5962-8974501EA	3-to-8-Line Decoder/DeMUX, Dual Brand	3805
C	CD54HCT240F3A	8550501RA	Octal Buffer Line Driver, Three-State, Inverter, Dual Brand	3806
C	CD54HCT241F3A		Octal Buffer Line Driver, Three-State	3807
C	CD54HCT243F3A		Quad Bus Transceiver, Three-State	3808
C	CD54HCT244F3A	8513001RA	Octal Buffer Line Driver, Three-State, Dual Brand	3809

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	CD54HCT245F3A	8550601RA	Octal Buffer Transceiver, Three-State, Dual Brand	3810
C	CD54HCT251F3A	5962-9052401MEA	8-Input MUX, Three-State, Dual Brand	3811
C	CD54HCT257F3A	5962-8970501EA	Quad 2-Input MUX, Three-State, Dual Brand	3813
C	CD54HCT258F3A	5962-8970801EA	Quad 2-Line-to-4-Line Data Selector, Dual Brand	3814
C	CD54HCT259F3A	5962-8985201EA	8-Bit Addressable Latch, Dual Brand	3815
C	CD54HCT273F3A	5962-8772501RA	8-Input NAND, Dual Brand	3816
C	CD54HCT27F3A	5962-8970301CA	Triple 3-Input NOR Gate, Dual Brand	3763
C	CD54HCT280F3A		8-Bit Odd/Even Parity Generator Checker	3817
C	CD54HCT283F3A		4-Bit Full Adder with Fast Carry	3818
C	CD54HCT299F3A	5962-8943601MRA	8-Bit Universal Shift Register, Three-State, Dual Brand	3820
C	CD54HCT30F3A	5962-8974601MRA	8-Input NAND, Dual Brand	3764
C	CD54HCT32F3A	5962-8685201CA	Quad 2-Input OR Gate, Dual Brand	3765
C	CD54HCT365F3A		Hex Buffer/Line Driver, Three-State	3823
C	CD54HCT367F3A	5962-9070601MEA	Hex Buffer/Line Drive, Three-State, Dual Brand	3825
C	CD54HCT373F3A	5962-8686701RA	Octal Transparent Latch, Three-State, Dual Brand	3827
C	CD54HCT374F3A	8550701RA	Octal D-Type Flip-Flop, Three-State, Dual Brand	3828
C	CD54HCT377F3A	5962-8976901RA	Octal D-Type Flip-Flop with Data Enable, Dual Brand	3829
C	CD54HCT390F3A	5962-9098401MEA	Dual Decade Ripple Counter, Dual Brand	3830
C	CD54HCT393F3A	5962-8989001CA	Dual 4-Bit Binary Ripple Counter, Dual Brand	3831
C	CD54HCT40105F3A		4-Bit By 16 Word FIFO Register	3874
C	CD54HCT4017F3A	5962-9059701MEA	14-Stage Binary Ripple Counter, Dual Brand	3848
C	CD54HCT4020F3A	5962-8945801EA	12-Bit Binary Ripple Counter, Dual Brand	3849
C	CD54HCT4024F3A		7-Stage Binary Ripple Counter	3850
C	CD54HCT4040F3A	5962-8994701MEA	12-Bit Binary Ripple Counter, Dual Brand	3851
C	CD54HCT4046AF3A	5962-8875701EA	Phased Locked-Loop with VCO, Dual Brand	3852
C	CD54HCT4051F3A	5962-9065401MEA	8-Channel Analog MUX/DeMUX, Dual Brand	3855
C	CD54HCT4053F3A		Triple 2-Channel Analog MUX/DeMUX	3857
C	CD54HCT4059F3A	5962-8862401JA	Programmable Divided-by-N Counter, Dual Brand	3858
C	CD54HCT4060F3A	5962-8977101EA	14-Stage Binary Ripple Counter with Oscillator, Dual Brand	3859
C	CD54HCT4075F3A		Triple 3-Input OR Gate	3861
C	CD54HCT423F3A		Dual Retriggerable Monostable Multivibrator with Reset	3832
C	CD54HCT4520F3A		Dual 4-Bit Synchronous Binary Counter	3869
C	CD54HCT4538F3A		Dual Precision Monostable Multivibrator	3870
C	CD54HCT533F3A		Octal Transparent Latch, Three-State	3833
C	CD54HCT534F3A	5962-8984901RA	Octal D Flip-Flop Three-State, Inverter, Dual Brand	3834
C	CD54HCT541F3A		Octal Buffer/Line Driver, Three-State	3836
C	CD54HCT564F3A		Octal D Flip-Flop Three-State, Inverter	3838
C	CD54HCT573F3A	5962-8685601RA	Octal Transparent Latch, Three-State, Dual Brand	3839
C	CD54HCT574F3A	5962-8974201RA	Octal D-Type Flip-Flop, Three-State, Dual Brand	3840
C	CD54HCT640F3A	5962-8974001RA	Octal Bus Transceiver, Three-State, Inverter, Dual Brand	3842
C	CD54HCT646F3A		Octal Bus Transceiver	3843
C	CD54HCT688F3A	5962-8685701RA	8-Bit Magnitude Comparator, Dual Brand	3845
C	CD54HCT74F3A	5962-8685301CA	Dual 3 Flip-Flop with Set and Reset, Dual Brand	3768
C	CD54HCT75F3A	5962-9075801MEA	Quad Bistable Transparent Latch, Dual Brand	3769
C	CD54HCT85F3A	5962-8867201EA	4-Bit Magnitude Comparator, Dual Brand	3770
C	CD54HCT86F3A	5962-8984401CA	Quad 2-Input Exclusive OR Gate, Dual Brand	3771
C	CD54HCU04F3A	8601001CA	Hex Inverter, Unbuffered, Dual Brand	3875
N	CDP1802ACD3		MPU - 40 Lead SBDIP	1441
N	CDP1821CD3		RAM - 16 Lead CERDIP 5.0V 255ns 1024 x 1	2983
N	CDP1822CD3		RAM - 22 Lead CERDIP 5.0V 500ns 256 x 4	2981

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	CDP1823CD3		RAM - 24 Lead CERDIP 5.0V 505ns 128 x 8	2982
N	CDP1824CD3		RAM - 18 Lead CERDIP 5.0V 825ns 32 x 8	1717
N	CDP1824D3		RAM - 18 Lead CERDIP 10.0V 375ns 32 x 8	1717
N	CDP1852CD3		I/O Port	1694
N	CDP1852D3		I/O Port	1694
N	CDP1853CD3		I/O Decoder	1713
N	CDP1854ACD3		I/O UART	1715
C	CMM5104D3	5962-9669401QVC	Rad Hard CMOS/SOS 4K x 1 Static RAM	3406
C	CMM5104D1DZ	5962D9669401VVC	Rad Hard CMOS/SOS 4K x 1 Static RAM	3406
C	CMM5104K3	5962-9669401QXC	Rad Hard CMOS/SOS 4K x 1 Static RAM	3406
C	CMM5104K1DZ	5962D9669401VXC	Rad Hard CMOS/SOS 4K x 1 Static RAM	3406
C	CMM5114AD1DZ	5962D9669501VVC	Rad Hard CMOS/SOS 1K x 4 Static RAM	2081
C	CMM5114AK3	5962-9669501QXC	Rad Hard CMOS/SOS 1K x 4 Static RAM	2081
C	CMM5114AD3	5962-9669501QVC	Rad Hard CMOS/SOS 1K x 4 Static RAM	2081
C	CMM5114AK1DZ	5962D9669501VXC	Rad Hard CMOS/SOS 1K x 4 Static RAM	2081
C	DG181AA/883B		Analog Switch Channel 10 Pin Can 15V Dual SPST JFET	3114
C	DG181AL/883B		Analog Switch Channel 14 Lead Flatpack 15V Dual SPST JFET	3114
C	DG181AP/883B		Analog Switch Channel 14 Lead CDIP 15V Dual SPST JFET	3114
C	DG182AA/883B		Analog Switch Channel 10 Pin Can 15V Dual SPST JFET	3114
C	DG182AP/883B		Analog Switch Channel 14 Lead CDIP 15V Dual SPST JFET	3114
C	DG184AL/883B		Analog Switch Channel 14 Lead Flatpack 15V Dual DPST JFET	3114
C	DG184AP/883B		Analog Switch Channel 16 Lead CDIP 15V Dual DPST JFET	3114
C	DG185AP/883B		Analog Switch Channel 16 Lead CDIP 15V Dual DPST JFET	3114
C	DG187AA/883B		Analog Switch Channel 10 Pin Can 15V SPDT JFET	3114
C	DG187AL/883B		Analog Switch Channel 14 Lead Flatpack 15V SPDT JFET	3114
C	DG187AP/883B		Analog Switch Channel 14 Lead CERDIP 15V SPDT JFET	3114
C	DG188AA/883B		Analog Switch Channel 10 Pin Can 15V SPDT JFET	3114
C	DG188AP/883B		Analog Switch Channel 14 Lead CERDIP 15V SPDT JFET	3114
C	DG190AL/883B		Analog Switch Channel 14 Lead Flatpack 15V Dual SPDT JFET	3114
C	DG190AP/883B		Analog Switch Channel 16 Lead CDIP 15V Dual SPDT JFET	3114
C	DG191AL/883B		Analog Switch Channel 14 Lead Flatpack 15V Dual SPDT JFET	3114
C	DG191AP/883B		Analog Switch Channel 16 Lead CDIP 15V Dual SPDT JFET	3114
C	DG200AA/883B		Analog Switch Channel 10 Pin Can 15V Dual SPST CMOS	3115
C	DG200AK/883B		Analog Switch Channel 14 Lead CDIP 15V Dual SPST CMOS	3115
C	DG201AAK/883B	7705301EA	Analog Switch Channel 16 Lead CDIP 15V Quad SPST CMOS	3117
	DG201AAP	JM38510/12302BEA	See Ref P/N	3117
C	DG201AK/883B		Analog Switch Channel 16 Lead CDIP 15V Quad SPST CMOS	3115
C	DG202AK/883B		Analog Switch Channel 16 Lead CDIP 15V Quad SPST CMOS	3117
C	DG300AAA/883B		Analog Switch Channel 10 Pin Can 15V Dual SPST CMOS	3119
C	DG300AAK/883B		Analog Switch Channel 14 Lead CDIP 15V Dual SPST CMOS	3119
	DG300AAP	JM38510/11601BCA	See Ref P/N	3119
C	DG301AAA/883B		Analog Switch Channel 10 Pin Can 15V SPDT CMOS	3119
C	DG301AAK/883B		Analog Switch Channel 14 Lead CDIP 15V SPDT CMOS	3119
	DG301AAP	JM38510/11602BCA	See Ref P/N	3119
C	DG302AAK/883B		Analog Switch Channel 14 Lead CDIP 15V Dual DPST CMOS	3119
	DG302AAP	JM38510/11603BCA	See Ref P/N	3119
C	DG303AAK/883B		Analog Switch Channel 14 Lead CDIP 15V Dual SPDT CMOS	3119
	DG303AAP	JM38510/11604BCA	See Ref P/N	3119
C	DG308AAK/883B		Analog Switch Channel 16 Lead CDIP 15V Quad SPST CMOS	3120
C	DG309AK/883B		Analog Switch,16 Lead CERDIP 15V Quad SPST CMOS	3120

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	DG401AK/883	5962-9056901EA	Analog Switch, Two SPST, Dual Brand	3703
N	DG401EJ		Switch, Two SPST, Extended Processing, -40°C+85°C, w/BI, PDIP	3284
N	DG401EY		Switch, Two SPST, Extended Processing, -40°C+85°C, w/BI, SOIC	3284
N	DG401EY-T		Switch, Two SPST, Extended Processing, -40°C+85°C, w/BI, T&R, SOIC	3284
C	DG403AK/883	5962-8976301MEA	Analog Switch, Two SPDT, Dual Brand	3703
N	DG403EJ		Switch, Two SPDT, Extended Processing, -40°C to 85°C w/BI, PDIP	3284
N	DG403EY		Switch, Two SPDT, Extended Processing, -40°C to 85°C w/BI, SOIC	3284
N	DG403EY-T		Switch, Two SPDT, Extended Process, -40°C+85°C w/BI, T&R SOIC	3284
C	DG405AK/883	5962-8996101EA	Analog Switch, Two DPST, Dual Brand	3703
N	DG405EJ		Switch, Two DPST, Extended Processing, -40°C+85°C W/BI, PDIP	3284
N	DG405EY		Switch, Two DPST, Extended Processing, -40°C+85°C w/BI, SOIC	3284
N	DG405EY-T		Switch, Two DPST, Extended Process, -40°C+85°C w/BI, T&R SOIC	3284
C	DG406AK/883		MUX, Single 16-Channel	3720
C	DG407AK/883		MUX, Differential 8-Channel	3720
C	DG408AK/883	5962-9204201MEA	Analog MUX, Single 8-Channel, Dual Brand	3688
N	DG408EJ		MUX, Single 8-Channel, Extended Process, -40°C+85°C w/BI, PDIP	3283
N	DG408EY		MUX, Single 8-Channel, Extended Process, -40°C+85°C w/BI, SOIC	3283
N	DG408EY-T		MUX, Single 8-Channel, Extended Process, -40°C+85°C w/BI, T&R	3283
C	DG409AK/883	5962-9204202MEA	Analog MUX, Differential 4-Channel, Dual Brand	3688
N	DG409EJ		MUX, Differential 4-Channel, Extended Process, -40°C+85°C, w/BI	3283
N	DG409EY		MUX, Differential 4-Channel, Extended Process, -40°C+85°C w/BI, SOIC	3283
N	DG409EY-T		MUX, Differential 4-Channel, Extended Process, -40°C+85°C w/BI, T&R SOIC	3283
C	DG411AK/883	5962-9073101MEA	Analog Switch, Quad SPST, Dual Brand	3681
N	DG411EJ		Switch, Quad SPST, Extended Processing, -40°C+85°C w/BI, PDIP	3282
N	DG411EY		Switch, Quad SPST, Extended Processing, -40°C+85°C w/BI, SOIC	3282
N	DG411EY-T		Switch, Quad SPST, Extended Process, -40°C+85°C w/BI, T&R SOIC	3282
C	DG412AK/883	5962-9073102MEA	Analog Switch, Quad SPST, Dual Brand	3681
N	DG412EJ		Switch, Quad SPST, Extended Processing, -40°C+85°C w/BI, PDIP	3282
N	DG412EY		Switch, Quad SPST, Extended Processing, -40°C+85°C w/BI, SOIC	3282
N	DG412EY-T		Switch, Quad SPST, Extended Process, -40°C+85°C w/BI, T&R SOIC	3282
C	DG413AK/883	5962-9073103MEA	Analog Switch, Quad SPST, Dual Brand	3681
N	DG413EJ		Switch, Quad SPST, Extended Processing, -40°C+85°C-40°C+85°C w/BI, PDIP	3282
N	DG413EY		Switch, Quad SPST, Extended Processing, -40°C+85°C w/BI, SOIC	3282

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	DG413EY-T		Switch, Quad SPST, Extended Process, -40°C+85°C w/BI, T&R SOIC	3282
C	DG441AK/883	5962-9204101MEA	Analog Switch, Quad SPST, Dual Brand	3687
N	DG441EJ		Switch, Quad SPST, Extended Processing, -40°C+85°C w/BI, PDIP	3281
N	DG441EY		Switch, Quad SPST, Extended Processing, -40°C+85°C w/BI, SOIC	3281
N	DG441EY-T		Switch, Quad SPST, Extended Process, -40°C+85°C w/BI, T&R SOIC	3281
C	DG442AK/883	5962-9204102MEA	Analog Switch, Quad SPST, Dual Brand	3687
N	DG442EJ		Switch, Quad SPST, Extended Processing -40°C+85°C, w/BI, PDIP	3281
N	DG442EY		Switch, Quad SPST, Extended Processing, -40°C+85°C w/BI, SOIC	3281
N	DG442EY-T		Switch, Quad SPST, Extended Process, -40°C+85°C w/BI, T&R	3281
C	DG458AK/883B		MUX, 16 Lead CDIP, 15V, 8-Channel, Over-Voltage Protected	3708
C	DG459AK/883B		MUX, 16 Lead CDIP, 15V, 8-Channel, Over-Voltage Protected	3708
C	DG506AAK/883B		Analog MUX, 28 Lead CERDIP, 15V, 16-Channel	3137
C	DG507AAK/883B		Analog MUX, 28 Lead CERDIP, 15V Differential 8-Channel	3137
C	DG508AAK/883B		Analog MUX, 16 Lead CERDIP,15V 8-Channel	3137
C	DG509AAK/883B		Analog MUX, 16 Lead CERDIP,15V Differential 4-Channel	3137
C	DG526AK/883B		Analog MUX, 28 Lead CERDIP,15V 16-Channel Latchable	3139
C	DG527AK/883B		Analog MUX, 28 Lead CDIP,15V Dual 8-Channel Latchable	3139
C	DG528AK/883B		Analog MUX, 18 Lead CERDIP,15V 8-Channel Latchable	3139
C	DG529AK/883B		Analog MUX, 18 Lead CDIP 15V Dual 4-Channel Latchable	3139
N	FRE160D1	2N7300D	Rad Hard Power NMOS 100V, 41A, 0.050Ω 10K, TO-258AA	3258
N	FRE160H4	2N7300H	Rad Hard Power NMOS 100V, 41A, 0.050Ω 1M, TO-258AA	3258
N	FRE160R1	2N7300R	Rad Hard Power NMOS 100V, 41A, 0.050Ω 100K, TO-258AA	3258
N	FRE160R4	2N7300R	Rad Hard Power NMOS 100V, 41A, 0.050Ω 100K, TO-258AA	3258
N	FRE260D1	2N7302D	Rad Hard Power NMOS 200V, 31A, 0.080Ω 10K, TO-258AA	3259
N	FRE260H4	2N7302H	Rad Hard Power NMOS 200V, 31A, 0.080Ω 1M, TO-258AA	3259
N	FRE260R1	2N7302R	Rad Hard Power NMOS 200V, 31A, 0.080Ω 100K, TO-258AA	3259
N	FRE260R4	2N7302R	Rad Hard Power NMOS 200V, 31A, 0.080Ω 100K, TO-258AA	3259
N	FRE264D1	2N7304D	Rad Hard Power NMOS 250V, 23A, 0.130Ω 10K, TO-258AA	3260
N	FRE264H4	2N7304H	Rad Hard Power NMOS 250V, 23A, 0.130Ω 1M, TO-258AA	3260
N	FRE264R1	2N7304R	Rad Hard Power NMOS 250V, 23A, 0.130Ω 100K, TO-258AA	3260
N	FRE264R4	2N7304R	Rad Hard Power NMOS 250V, 23A, 0.130Ω 100K, TO-258AA	3260
N	FRE460D1	2N7306D	Rad Hard Power NMOS 500V, 12A, 0.410Ω 10K, TO-258AA	3261
N	FRE460H4	2N7306H	Rad Hard Power NMOS 500V, 12A, 0.410Ω 1M, TO-258AA	3261
N	FRE460R1	2N7306R	Rad Hard Power NMOS 500V, 12A, 0.410Ω 100K, TO-258AA	3261
N	FRE460R4	2N7306R	Rad Hard Power NMOS 500V, 12A, 0.410Ω 100K, TO-258AA	3261
N	FRE9160D1	2N7329D	Rad Hard Power PMOS 100V, 30A, 0.095Ω 10K, TO-258AA	3268
N	FRE9160H4	2N7329H	Rad Hard Power PMOS 100V, 30A, 0.095Ω 1M, TO-258AA	3268
N	FRE9160R1	2N7329R	Rad Hard Power PMOS 100V, 30A, 0.095Ω 100K,TO-258AA	3268
N	FRE9160R4	2N7329R	Rad Hard Power PMOS 100V, 30A, 0.095Ω 100K, TO-258AA	3268
N	FRE9260D1	2N7331D	Rad Hard Power PMOS 200V, 19A, 0.210Ω 10K, TO-258AA	3269
N	FRE9260H4	2N7331H	Rad Hard Power PMOS 200V, 19A, 0.210Ω 1M, TO-258AA	3269
N	FRE9260R1	2N7331R	Rad Hard Power PMOS 200V, 19A, 0.210Ω 100K, TO-258AA	3269
C	FRE9260R3	2N7331R	Rad Hard Power PMOS 200V, 19A, 0.210Ω 100K, TO-258AA	3269
N	FRE9260R4	2N7331R	Rad Hard Power PMOS 200V, 19A, 0.210Ω 100K, TO-258AA	3269
N	FRF150D1	2N7292D	Rad Hard Power NMOS 100V, 25A, 0.07Ω 10K, TO-254AA	3215

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	FRF150D3	2N7292D	Rad Hard Power NMOS 100V, 25A, 0.07Ω 10K, TO-254AA	3215
N	FRF150H1	2N7292H	Rad Hard Power NMOS 100V, 25A, 0.07Ω 1M, TO-254AA	3215
N	FRF150H4	2N7292H	Rad Hard Power NMOS 100V, 25A, 0.07Ω 1M, TO-254AA	3215
N	FRF150R1	2N7292R	Rad Hard Power NMOS 100V, 25A, 0.07Ω 100K, TO-254AA	3215
C	FRF150R2	2N7292R	Rad Hard Power NMOS 100V, 25A, 0.07Ω 100K, TO-254AA	3215
C	FRF150R3	2N7292R	Rad Hard Power NMOS 100V, 25A, 0.07Ω 100K, TO-254AA	3215
C	FRF150R4	JANSR2N7292	Rad Hard Power NMOS 100V, 25A, 0.07Ω 100K, TO-254AA	3215
N	FRF250D1	2N7294D	Rad Hard Power NMOS 200V, 23A, 0.115Ω 10K, TO-254AA	3227
C	FRF250D2	2N7294D	Rad Hard Power NMOS 200V, 23A, 0.115Ω 10K, TO-254AA	3227
N	FRF250H4	2N7294H	Rad Hard Power NMOS 200V, 23A, 0.115Ω 1M, TO-254AA	3227
N	FRF250R1	2N7294R	Rad Hard Power NMOS 200V, 23A, 0.115Ω 100K, TO-254AA	3227
C	FRF250R3	2N7294R	Rad Hard Power NMOS 200V, 23A, 0.115Ω 100K, TO-254AA	3227
C	FRF250R4	JANSR2N7294	Rad Hard Power NMOS 200V, 23A, 0.115Ω 100K, TO-254AA	3227
N	FRF254D1	2N7296D	Rad Hard Power NMOS 250V, 17A, 0.185Ω 10K, TO-254AA	3232
N	FRF254H4	2N7296H	Rad Hard Power NMOS 250V, 17A, 0.185Ω 1M, TO-254AA	3232
C	FRF254R1	JANSR2N7296	Rad Hard Power NMOS 250V, 17A, 0.185Ω 100K, TO-254AA	3232
N	FRF254R4	2N7296R	Rad Hard Power NMOS 250V, 17A, 0.185Ω 100K, TO-254AA	3232
N	FRF450D1	2N7298D	Rad Hard Power NMOS 500V, 9A, 0.615Ω 10K, TO-254AA	3237
C	FRF450D3	2N7298D	Rad Hard Power NMOS 500V, 9A, 0.615Ω 10K, TO-254AA	3237
N	FRF450H4	2N7298H	Rad Hard Power NMOS 500V, 9A, 0.615Ω 1M, TO-254AA	3237
N	FRF450R1	2N7298R	Rad Hard Power NMOS 500V, 9A, 0.615Ω 100K, TO-254AA	3237
C	FRF450R4	JANSR2N7298	Rad Hard Power NMOS 500V, 9A, 0.615Ω 100K, TO-254AA	3237
N	FRF9150D1	2N7323D	Rad Hard Power PMOS 100V, 23A, 0.140Ω 10K, TO-254AA	3243
N	FRF9150H1	2N7323H	Rad Hard Power PMOS 100V, 23A, 0.140Ω 1M, TO-254AA	3243
N	FRF9150H4	2N7323H	Rad Hard Power PMOS 100V, 23A, 0.140Ω 1M, TO-254AA	3243
N	FRF9150R1	2N7323R	Rad Hard Power PMOS 100V, 23A, 0.140Ω 100K, TO-254AA	3243
C	FRF9150R3	2N7323R	Rad Hard Power PMOS 100V, 23A, 0.140Ω 100K, TO-254AA	3243
N	FRF9150R4	2N7323R	Rad Hard Power PMOS 100V, 23A, 0.140Ω 100K, TO-254AA	3243
N	FRF9250D1	2N7325D	Rad Hard Power PMOS 200V, 14A, 0.315Ω 10K, TO-254AA	3247
C	FRF9250D3	2N7325D	Rad Hard Power PMOS 200V, 14A, 0.315Ω 10K, TO-254AA	3247
N	FRF9250H4	2N7325H	Rad Hard Power PMOS 200V, 14A, 0.315Ω 1M, TO-254AA	3247
N	FRF9250R1	2N7325R	Rad Hard Power PMOS 200V, 14A, 0.315Ω 100K, TO-254AA	3247
C	FRF9250R3	2N7325R	Rad Hard Power PMOS 200V, 14A, 0.315Ω 100K, TO-254AA	3247
N	FRF9250R4	2N7325R	Rad Hard Power PMOS 200V, 14A, 0.315Ω 100K, TO-254AA	3247
N	FRK150D1	2N7291D	Rad Hard Power NMOS 100V, 40A, 0.055Ω 10K, TO-204AE	3221
C	FRK150D3	2N7291D	Rad Hard Power NMOS 100V, 40A, 0.055Ω 10K, TO-204AE	3221
N	FRK150H4	2N7291H	Rad Hard Power NMOS 100V, 40A, 0.055Ω 1M, TO-204AE	3221
N	FRK150R1	2N7291R	Rad Hard Power NMOS 100V, 40A, 0.055Ω 100K, TO-204AE	3221
C	FRK150R2	2N7291R	Rad Hard Power NMOS 100V, 40A, 0.055Ω 100K, TO-204AE	3221
N	FRK150R4	2N7291R	Rad Hard Power NMOS 100V, 40A, 0.055Ω 100K, TO-204AE	3221
N	FRK250D1	2N7293D	Rad Hard Power NMOS 200V, 27A, 0.100Ω 10K, TO-204AE	3226
N	FRK250H4	2N7293H	Rad Hard Power NMOS 200V, 27A, 0.100Ω 1M, TO-204AE	3226
N	FRK250R1	2N7293R	Rad Hard Power NMOS 200V, 27A, 0.100Ω 100K, TO-204AE	3226
N	FRK250R4	2N7293R	Rad Hard Power NMOS 200V, 27A, 0.100Ω 100K, TO-204AE	3226
N	FRK254D1	2N7295D	Rad Hard Power NMOS 250V, 20A, 0.170Ω 10K, TO-204AE	3231
N	FRK254H4	2N7295H	Rad Hard Power NMOS 250V, 20A, 0.170Ω 1M, TO-204AE	3231
N	FRK254R1	2N7295R	Rad Hard Power NMOS 250V, 20A, 0.170Ω 100K, TO-204AE	3231
N	FRK254R4	2N7295R	Rad Hard Power NMOS 250V, 20A, 0.170Ω 100K, TO-204AE	3231
N	FRK160D1	2N7299D	Rad Hard Power NMOS 100V, 50A, 0.040Ω 10K, TO-204AE	3222
C	FRK160D3	2N7299D	Rad Hard Power NMOS 100V, 50A, 0.040Ω 10K, TO-204AE	3222

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	FRK160H4	2N7299H	Rad Hard Power NMOS 100V, 50A, 0.040Ω 1M, TO-204AE	3222
N	FRK160R1	2N7299R	Rad Hard Power NMOS 100V, 50A, 0.040Ω 100K, TO-204AE	3222
C	FRK160R2	2N7299R	Rad Hard Power NMOS 100V, 50A, 0.040Ω 100K, TO-204AE	3222
N	FRK160R4	2N7299R	Rad Hard Power NMOS 100V, 50A, 0.040Ω 100K, TO-204AE	3222
N	FRK260D1	2N7301D	Rad Hard Power NMOS 200V, 46A, 0.07Ω 10K, TO-204AE	3228
N	FRK260H4	2N7301H	Rad Hard Power NMOS 200V, 46A, 0.07Ω 1M, TO-204AE	3228
N	FRK260R1	2N7301R	Rad Hard Power NMOS 200V, 46A, 0.07Ω 100K, TO-204AE	3228
C	FRK260R3	2N7301R	Rad Hard Power NMOS 200V, 46A, 0.07Ω 100K, TO-204AE	3228
N	FRK260R4	2N7301R	Rad Hard Power NMOS 200V, 46A, 0.07Ω 100K, TO-204AE	3228
N	FRK264D1	2N7303D	Rad Hard Power NMOS 250V, 34A, 0.120Ω 10K, TO-204AE	3233
N	FRK264H4	2N7303H	Rad Hard Power NMOS 250V, 34A, 0.120Ω 1M, TO-204AE	3233
N	FRK264R1	2N7303R	Rad Hard Power NMOS 250V, 34A, 0.120Ω 100K, TO-204AE	3233
N	FRK264R4	2N7303R	Rad Hard Power NMOS 250V, 34A, 0.120Ω 100K, TO-204AE	3233
N	FRK460D1	2N7305D	Rad Hard Power NMOS 500V, 17A, 0.40Ω 10K, TO-204AE	3238
N	FRK460H4	2N7305H	Rad Hard Power NMOS 500V, 17A, 0.40Ω 1M, TO-204AE	3238
N	FRK460R1	2N7305R	Rad Hard Power NMOS 500V, 17A, 0.40Ω 100K, TO-204AE	3238
N	FRK460R4	2N7305R	Rad Hard Power NMOS 500V, 17A, 0.40Ω 100K, TO-204AE	3238
N	FRK9150D1	2N7322D	Rad Hard Power PMOS 100V, 26A, 0.125Ω 10K, TO-204AE	3266
N	FRK9150H4	2N7322H	Rad Hard Power PMOS 100V, 26A, 0.125Ω 1M, TO-204AE	3266
N	FRK9150R1	2N7322R	Rad Hard Power PMOS 100V, 26A, 0.125Ω 100K, TO-204AE	3266
C	FRK9150R3	2N7322R	Rad Hard Power PMOS 100V, 26A, 0.125Ω 100K, TO-204AE	3266
N	FRK9150R4	2N7322R	Rad Hard Power PMOS 100V, 26A, 0.125Ω 100K, TO-204AE	3266
N	FRK9160D1	2N7328D	Rad Hard Power PMOS 100V, 40A, 0.085Ω 10K, TO-204AE	3244
C	FRK9160D2	2N7328D	Rad Hard Power PMOS 100V, 40A, 0.085Ω 10K, TO-204AE	3244
C	FRK9160D3	2N7328D	Rad Hard Power PMOS 100V, 40A, 0.085Ω 10K, TO-204AE	3244
N	FRK9160H4	2N7328H	Rad Hard Power PMOS 100V, 40A, 0.085Ω 1M, TO-204AE	3244
N	FRK9160R1	2N7328R	Rad Hard Power PMOS 100V, 40A, 0.085Ω 100K, TO-204AE	3244
C	FRK9160R3	2N7328R	Rad Hard Power PMOS 100V, 40A, 0.085Ω 100K, TO-204AE	3244
N	FRK9160R4	2N7328R	Rad Hard Power PMOS 100V, 40A, 0.085Ω 100K, TO-204AE	3244
N	FRK9260D1	2N7330D	Rad Hard Power PMOS 200V, 26A, 0.200Ω 10K, TO-204AE	3248
N	FRK9260H4	2N7330H	Rad Hard Power PMOS 200V, 26A, 0.200Ω 1M, TO-204AE	3248
N	FRK9260R1	2N7330R	Rad Hard Power PMOS 200V, 26A, 0.200Ω 100K, TO-204AE	3248
N	FRK9260R4	2N7330R	Rad Hard Power PMOS 200V, 26A, 0.200Ω 100K, TO-204AE	3248
N	FRL130D1	2N7272D	Rad Hard Power NMOS 100V, 8A, 0.180Ω 10K, TO-205AF	3218
C	FRL130D2	2N7272D	Rad Hard Power NMOS 100V, 8A, 0.180Ω 10K, TO-205AF	3218
C	FRL130H3	2N7272H	Rad Hard Power NMOS 100V, 8A, 0.180Ω 1M, TO-205AF	3218
N	FRL130H4	2N7272H	Rad Hard Power NMOS 100V, 8A, 0.180Ω 1M, TO-205AF	3218
N	FRL130R1	2N7272R	Rad Hard Power NMOS 100V, 8A, 0.180Ω 100K, TO-205AF	3218
C	FRL130R2	2N7272R	Rad Hard Power NMOS 100V, 8A, 0.180Ω 100K, TO-205AF	3218
C	FRL130R3	2N7272R	Rad Hard Power NMOS 100V, 8A, 0.180Ω 100K, TO-205AF	3218
C	FRL130R4	JANSR2N7272	Rad Hard Power NMOS 100V, 8A, 0.180Ω 100K, TO-205AF	3218
N	FRL230D1	2N7275D	Rad Hard Power NMOS 200V, 5A, 0.500Ω 10K TO-205AF	3223
C	FRL230D3	2N7275D	Rad Hard Power NMOS 200V, 5A, 0.500Ω 10K, TO-205AF	3223
N	FRL230H1	2N7275H	Rad Hard Power NMOS 200V, 5A, 0.500Ω 1M, TO-205AF	3223
N	FRL230H4	2N7275H	Rad Hard Power NMOS 200V, 5A, 0.500Ω 1M, TO-205AF	3223
N	FRL230R1	2N7275R	Rad Hard Power NMOS 200V, 5A, 0.500Ω 100K, TO-205AF	3223
C	FRL230R3	2N7275R	Rad Hard Power NMOS 200V, 5A, 0.500Ω 100K, TO-205AF	3223
C	FRL230R4	JANSR2N7275	Rad Hard Power NMOS 200V, 5A, 0.500Ω 100K, TO-205AF	3223
N	FRL234D1	2N7278D	Rad Hard Power NMOS 250V, 4A, 0.70Ω 10K, TO-205AF	3229
C	FRL234D3	2N7278D	Rad Hard Power NMOS 250V, 4A, 0.70Ω 10K, TO-205AF	3229

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	FRL234H4	2N7278H	Rad Hard Power NMOS 250V, 4A, 0.70Ω 1M, TO-205AF	3229
N	FRL234R1	2N7278R	Rad Hard Power NMOS 250V, 4A, 0.70Ω 100K, TO-205AF	3229
C	FRL234R3	2N7278R	Rad Hard Power NMOS 250V, 4A, 0.70Ω 100K, TO-205AF	3229
C	FRL234R4	JANSR2N7278	Rad Hard Power NMOS 250V, 4A, 0.70Ω 100K, TO-205AF	3229
N	FRL430D1	2N7281D	Rad Hard Power NMOS 500V, 2A, 2.50Ω 10K, TO-205AF	3234
C	FRL430D3	2N7281D	Rad Hard Power NMOS 500V, 2A, 2.50Ω 10K, TO-205AF	3234
N	FRL430H4	2N7281H	Rad Hard Power NMOS 500V, 2A, 2.50Ω 1M, TO-205AF	3234
N	FRL430R1	2N7281R	Rad Hard Pcwer NMOS 500V, 2A, 2.50Ω 100K, TO-205AF	3234
N	FRL430R4	2N7281R	Rad Hard Power NMOS 500V, 2A, 2.50Ω 100K, TO-205AF	3234
N	FRL9130D1	2N7308D	Rad Hard Power PMOS 100V, 5A, 0.550Ω 10K, TO-205AF	3239
C	FRL9130D2	2N7308D	Rad Hard Power PMOS 100V, 5A, 0.550Ω 10K, TO-205AF	3239
C	FRL9130D3	2N7308D	Rad Hard Power PMOS 100V, 5A, 0.550Ω 10K, TO-205AF	3239
N	FRL9130H4	2N7308H	Rad Hard Power PMOS 100V, 5A, 0.550Ω 1M, TO-205AF	3239
N	FRL9130R1	2N7308R	Rad Hard Power PMOS 100V, 5A, 0.550Ω 100K, TO-205AF	3239
C	FRL9130R2	2N7308R	Rad Hard Power PMOS 100V, 5A, 0.550Ω 100K, TO-205AF	3239
C	FRL9130R3	2N7308R	Rad Hard Power PMOS 100V, 5A, 0.550Ω 100K, TO-205AF	3239
N	FRL9130R4	2N7308R	Rad Hard Power PMOS 100V, 5A, 0.550Ω 100K, TO-205AF	3239
N	FRL9230D1	2N7311D	Rad Hard Power PMOS 200V, 3A, 1.30Ω 10K, TO-205AF	3245
N	FRL9230H4	2N7311H	Rad Hard Power PMOS 200V, 3A, 1.30Ω 1M, TO-205AF	3245
N	FRL9230R1	2N7311R	Rad Hard Power PMOS 200V, 3A, 1.30Ω 100K, TO-205AF	3245
N	FRL9230R4	2N7311R	Rad Hard Power PMOS 200V, 3A, 1.30Ω 100K, TO-205AF	3245
N	FRM130D1	2N7271D	Rad Hard Power NMOS 100V, 14A, 0.180Ω 10K, TO-204AA	3217
N	FRM130H1	2N7271H	Rad Hard Power NMOS 100V, 14A, 0.180Ω 1M, TO-204AA	3217
N	FRM130H4	2N7271H	Rad Hard Power NMOS 100V, 14A, 0.180Ω 1M, TO-204AA	3217
N	FRM130R1	2N7271R	Rad Hard Power NMOS 100V, 14A, 0.180Ω 100K, TO-204AA	3217
N	FRM130R4	2N7271R	Rad Hard Power NMOS 100V, 14A, 0.180Ω 100K, TO-204AA	3217
N	FRM140D1	2N7283D	Rad Hard Power NMOS 100V, 23A, 0.130Ω 10K, TO-204AA	3220
N	FRM140H4	2N7283H	Rad Hard Power NMOS 100V, 23A, 0.130Ω 1M, TO-204AA	3220
N	FRM140R1	2N7283R	Rad Hard Power NMOS 100V, 23A, 0.130Ω 100K, TO-204AA	3220
N	FRM140R4	2N7283R	Rad Hard Power NMOS 100V, 23A, 0.130Ω 100K, TO-204AA	3220
N	FRM230D1	2N7274D	Rad Hard Power NMOS 200V, 8A, 0.500Ω 10K, TO-204AA	3249
N	FRM230H4	2N7274H	Rad Hard Power NMOS 200V, 8A, 0..500Ω 1M, TO-204AA	3249
N	FRM230R1	2N7274R	Rad Hard Power NMOS 200V, 8A, 0.500Ω 100K, TO-204AA	3249
N	FRM230R4	2N7274R	Rad Hard Power NMOS 200V, 8A, 0.500Ω 100K, TO-204AA	3249
N	FRM234D1	2N7277D	Rad Hard Power NMOS 250V, 7A, 0.700Ω 10K, TO-204AA	3250
N	FRM234H4	2N7277H	Rad Hard Power NMOS 250V, 7A, 0.700Ω 1M, TO-204AA	3250
N	FRM234R1	2N7277R	Rad Hard Power NMOS 250V, 7A, 0.700Ω 100K, TO-204AA	3250
N	FRM234R4	2N7277R	Rad Hard Power NMOS 250V, 7A, 0.700Ω 100K, TO-204AA	3250
N	FRM240D1	2N7285D	Rad Hard Power NMOS 200V, 16A, 0.240Ω 10K, TO-204AA	3225
N	FRM240H4	2N7285H	Rad Hard Power NMOS 200V, 16A, 0.240Ω 1M, TO-204AA	3225
N	FRM240R1	2N7285R	Rad Hard Power NMOS 200V, 16A, 0.240Ω 100K, TO-204AA	3225
N	FRM240R4	2N7285R	Rad Hard Power NMOS 200V, 16A, 0.240Ω 100K, TO-204AA	3225
N	FRM244D1	2N7287D	Rad Hard Power NMOS 250V, 12A, 0.400Ω 10K, TO-204AA	3230
N	FRM244H4	2N7287H	Rad Hard Power NMOS 250V, 12A, 0.400Ω 1M, TO-204AA	3230
N	FRM244R1	2N7287R	Rad Hard Power NMOS 250V, 12A, 0.400Ω 100K, TO-204AA	3230
N	FRM244R4	2N7287R	Rad Hard Power NMOS 250V, 12A, 0.400Ω 100K, TO-204AA	3230
N	FRM430D1	2N7280D	Rad Hard Power NMOS 500V, 3A, 2.50Ω 10K, TO-204AA	3252
N	FRM430H4	2N7280H	Rad Hard Power NMOS 500V, 3A, 2.50Ω 1M, TO-204AA	3252
N	FRM430R1	2N7280R	Rad Hard Power NMOS 500V, 3A, 2.50Ω 100K, TO-204AA	3252
N	FRM430R4	2N7280R	Rad Hard Power NMOS 500V, 3A, 2.50Ω 100K, TO-204AA	3252

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	FRM440D1	2N7289D	Rad Hard Power NMOS 500V, 6A, 1.40Ω 10K, TO-204AA	3235
N	FRM440H4	2N7289H	Rad Hard Power NMOS 500V, 6A, 1.40Ω 1M, TO-204AA	3235
N	FRM440R1	2N7289R	Rad Hard Power NMOS 500V, 6A, 1.40Ω 100K, TO-204AA	3235
N	FRM440R4	2N7289R	Rad Hard Power NMOS 500V, 6A, 1.40Ω 100K, TO-204AA	3235
N	FRM450D1	2N7297D	Rad Hard Power NMOS 500V, 10A, 0.60Ω 10K, TO-204AA	3236
C	FRM450D2	2N7297D	Rad Hard Power NMOS 500V, 10A, 0.60Ω 10K, TO-204AA	3236
N	FRM450H1	2N7297H	Rad Hard Power NMOS 500V, 10A, 0.60Ω 1M, TO-204AA	3236
N	FRM450H4	2N7297H	Rad Hard Power NMOS 500V, 10A, 0.60Ω 1M, TO-204AA	3236
N	FRM450R1	2N7297R	Rad Hard Power NMOS 500V, 10A, 0.60Ω 100K, TO-204AA	3236
N	FRM450R4	2N7297R	Rad Hard Power NMOS 500V, 10A, 0.60Ω 100K, TO-204AA	3236
N	FRM9130D1	2N7307D	Rad Hard Power PMOS 100V, 6A, 0.550Ω 10K, TO-204AA	3262
N	FRM9130H4	2N7307H	Rad Hard Power PMOS 100V, 6A, 0.550Ω 1M, TO-204AA	3262
N	FRM9130R1	2N7307R	Rad Hard Power PMOS 100V, 6A, 0.550Ω 100K, TO-204AA	3262
N	FRM9130R4	2N7307R	Rad Hard Power PMOS 100V, 6A, 0.550Ω 100K, TO-204AA	3262
N	FRM9140D1	2N7316D	Rad Hard Power PMOS 100V, 11A, 0.300Ω 10K, TO-204AA	3241
N	FRM9140H1	2N7316H	Rad Hard Power PMOS 100V, 11A, 0.300Ω 1M, TO-204AA	3241
N	FRM9140H4	2N7316H	Rad Hard Power PMOS 100V, 11A, 0.300Ω 1M, TO-204AA	3241
N	FRM9140R1	2N7316R	Rad Hard Power PMOS 100V, 11A, 0.300Ω 100K, TO-204AA	3241
N	FRM9140R4	2N7316R	Rad Hard Power PMOS 100V, 11A, 0.300Ω 100K, TO-204AA	3241
N	FRM9230D1	2N7310D	Rad Hard Power PMOS 200V, 4A, 1.30Ω 10K, TO-204AA	3263
N	FRM9230H4	2N7310H	Rad Hard Power PMOS 200V, 4A, 1.30Ω 1M, TO-204AA	3263
N	FRM9230R1	2N7310R	Rad Hard Power PMOS 200V, 4A, 1.30Ω 100K, TO-204AA	3263
N	FRM9230R4	2N7310R	Rad Hard Power PMOS 200V, 4A, 1.30Ω 100K, TO-204AA	3263
N	FRM9240D1	2N7318D	Rad Hard Power PMOS 200V, 7A, 0.72Ω 10K, TO-204AA	3242
N	FRM9240H4	2N7318H	Rad Hard Power PMOS 200V, 7A, 0.72Ω 1M, TO-204AA	3242
N	FRM9240R1	2N7318R	Rad Hard Power PMOS 200V, 7A, 0.72Ω 100K, TO-204AA	3242
N	FRM9240R4	2N7318R	Rad Hard Power PMOS 200V, 7A, 0.72Ω 100K, TO-204AA	3242
N	FRM9250D1	2N7324D	Rad Hard Power PMOS 200V, 16A, 0.30Ω 10K, TO-204AA	3267
N	FRM9250H4	2N7324H	Rad Hard Power PMOS 200V, 16A, 0.30Ω 1M TO-204AA	3267
N	FRM9250R1	2N7324R	Rad Hard Power PMOS 200V, 16A, 0.30Ω 100K TO-204AA	3267
N	FRM9250R4	2N7324R	Rad Hard Power PMOS 200V, 16A, 0.30Ω 100K TO-204AA	3267
N	FRS130D1	2N7273D	Rad Hard Power NMOS 100V, 12A, 0.195Ω 10K, TO-257AA	3219
N	FRS130H4	2N7273H	Rad Hard Power NMOS 100V, 12A, 0.195Ω 1M, TO-257AA	3219
N	FRS130R1	2N7273R	Rad Hard Power NMOS 100V, 12A, 0.195Ω 100K, TO-257AA	3219
C	FRS130R2	2N7273R	Rad Hard Power NMOS 100V, 12A, 0.195Ω 100K, TO-257AA	3219
C	FRS130R3	2N7273R	Rad Hard Power NMOS 100V, 12A, 0.195Ω 100K, TO-257AA	3219
N	FRS130R4	2N7273R	Rad Hard Power NMOS 100V, 12A, 0.195Ω 100K, TO-257AA	3219
N	FRS140D1	2N7284D	Rad Hard Power NMOS 100V, 17A, 0.145Ω 10K, TO-257AA	3254
N	FRS140H4	2N7284H	Rad Hard Power NMOS 100V, 17A, 0.145Ω 1M, TO-257AA	3254
N	FRS140R1	2N7284R	Rad Hard Power NMOS 100V, 17A, 0.145Ω 100K, TO-257AA	3254
C	FRS140R3	2N7284R	Rad Hard Power NMOS 100V, 17A, 0.145Ω 100K, TO-257AA	3254
N	FRS140R4	2N7284R	Rad Hard Power NMOS 100V, 17A, 0.145Ω 100K, TO-257AA	3254
N	FRS230D1	2N7276D	Rad Hard Power NMOS 200V, 7A, 0.515Ω 10K, TO-257AA	3224
N	FRS230H4	2N7276H	Rad Hard Power NMOS 200V, 7A, 0.515Ω 1M, TO-257AA	3224
N	FRS230R1	2N7276R	Rad Hard Power NMOS 200V, 7A, 0.515Ω 100K, TO-257AA	3224
N	FRS230R4	2N7276R	Rad Hard Power NMOS 200V, 7A, 0.515Ω 100K, TO-257AA	3224
N	FRS234D1	2N7279D	Rad Hard Power NMOS 250V, 5A, 0.715Ω 10K, TO-257AA	3251
N	FRS234H4	2N7279H	Rad Hard Power NMOS 250V, 5A, 0.715Ω 1M, TO-257AA	3251
N	FRS234R1	2N7279R	Rad Hard Power NMOS 250V, 5A, 0.715Ω 100K, TO-257AA	3251
N	FRS234R4	2N7279R	Rad Hard Power NMOS 250V, 5A, 0.715Ω 100K, TO-257AA	3251

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	FRS240D1	2N7286D	Rad Hard Power NMOS 200V, 12A, 0.255Ω 10K, TO-257AA	3255
N	FRS240H4	2N7286H	Rad Hard Power NMOS 200V, 12A, 0.255Ω 1M, TO-257AA	3255
N	FRS240R1	2N7286R	Rad Hard Power NMOS 200V, 12A, 0.255Ω 100K, TO-257AA	3255
N	FRS240R4	2N7286R	Rad Hard Power NMOS 200V, 12A, 0.255Ω 100K, TO-257AA	3255
N	FRS244D1	2N7288D	Rad Hard Power NMOS 250V, 9A, 0.415Ω 10K,TO-257AA	3256
N	FRS244H4	2N7288H	Rad Hard Power NMOS 250V, 9A, 0.415Ω 1M, TO-257AA	3256
N	FRS244R1	2N7288R	Rad Hard Power NMOS 250V, 9A, 0.415Ω 100K, TO-257AA	3256
N	FRS244R4	2N7288R	Rad Hard Power NMOS 250V, 9A, 0.415Ω 100K, TO-257AA	3256
N	FRS430D1	2N7282D	Rad Hard Power NMOS 500V, 3A, 2.52Ω 10K, TO-257AA	3253
N	FRS430H4	2N7282H	Rad Hard Power NMOS 500V, 3A, 2.52Ω 1M, TO-257AA	3253
N	FRS430R1	2N7282R	Rad Hard Power NMOS 500V, 3A, 2.52Ω 100K, TO-257AA	3253
N	FRS430R4	2N7282R	Rad Hard Power NMOS 500V, 3A, 2.52Ω 100K, TO-257AA	3253
N	FRS440D1	2N7290D	Rad Hard Power NMOS 500V, 5A, 1.42Ω 10K, TO-257AA	3257
C	FRS440D2	2N7290D	Rad Hard Power NMOS 500V, 5A, 1.42Ω 10K, TO-257AA	3257
N	FRS440H4	2N7290H	Rad Hard Power NMOS 500V, 5A, 1.42Ω 1M, TO-257AA	3257
N	FRS440R1	2N7290R	Rad Hard Power NMOS 500V, 5A, 1.42Ω 100K, TO-257AA	3257
C	FRS440R3	2N7290R	Rad Hard Power NMOS 500V, 5A, 1.42Ω 100K, TO-257AA	3257
N	FRS440R4	2N7290R	Rad Hard Power NMOS 500V, 5A, 1.42Ω 100K, TO-257AA	3257
N	FRS9130D1	2N7309D	Rad Hard Power PMOS 100V, 6A, 0.565Ω 10K, TO-257AA	3240
N	FRS9130H4	2N7309H	Rad Hard Power PMOS 100V, 6A, 0.565Ω 1M, TO-257AA	3240
N	FRS9130R1	2N7309R	Rad Hard Power PMOS 100V, 6A, 0.565Ω 100K, TO-257AA	3240
N	FRS9130R4	2N7309R	Rad Hard Power PMOS 100V, 6A, 0.565Ω 100K, TO-257AA	3240
N	FRS9140D1	2N7317D	Rad Hard Power PMOS 100V, 11A, 0.315Ω 10K, TO-257AA	3264
N	FRS9140H4	2N7317H	Rad Hard Power PMOS 100V, 11A, 0.315Ω 1M, TO-257AA	3264
N	FRS9140R1	2N7317R	Rad Hard Power PMOS 100V, 11A, 0.315Ω 100K, TO-257AA	3264
C	FRS9140R3	2N7317R	Rad Hard Power PMOS 100V, 11A, 0.315Ω 100K,TO-257AA	3264
N	FRS9140R4	2N7317R	Rad Hard Power PMOS 100V, 11A, 0.315Ω 100K, TO-257AA	3264
N	FRS9230D1	2N7312D	Rad Hard Power PMOS 200V, 4A, 1.32Ω 10K, TO-257AA	3246
N	FRS9230H4	2N7312H	Rad Hard Power PMOS 200V, 4A, 1.32Ω 1M, TO-257AA	3246
N	FRS9230R1	2N7312R	Rad Hard Power PMOS 200V, 4A, 1.32Ω 100K, TO-257AA	3246
N	FRS9230R4	2N7312R	Rad Hard Power PMOS 200V, 4A, 1.32Ω 100K, TO-257AA	3246
N	FRS9240D1	2N7319D	Rad Hard Power PMOS 200V, 7A, 0.735Ω 10K, TO-257AA	3265
N	FRS9240H4	2N7319H	Rad Hard Power PMOS 200V, 7A, 0.735Ω 1M, TO-257AA	3265
N	FRS9240R1	2N7319R	Rad Hard Power PMOS 200V, 7A, 0.735Ω 100K, TO-257AA	3265
N	FRS9240R4	2N7319R	Rad Hard Power PMOS 200V, 7A, 0.735Ω 100K, TO-257AA	3265
N	FSF055D1		SEGR Rad Hard Power NMOS 60V, 25A, 0.02Ω TO-254AA	4052
N	FSF055R1		SEGR Rad Hard Power NMOS 60V, 25A, 0.02Ω TO-254AA	4052
C	FSF055R3		SEGR Rad Hard Power NMOS 60V, 25A, 0.02Ω TO-254AA	4052
N	FSF055R4		SEGR Rad Hard Power NMOS 60V, 25A, 0.02Ω TO-254AA	4052
N	FSF150D1	2N7405D	SEGR Rad Hard Power NMOS 100V, 25A, 0.07Ω TO-254AA	3971
N	FSF150R1	2N7405R	SEGR Rad Hard Power NMOS 100V, 25A, 0.07Ω TO-254AA	3971
C	FSF150R3	2N7405R	SEGR Rad Hard Power NMOS 100V, 25A, 0.07Ω TO-254AA	3971
C	FSF150R4	JANSR2N7405	SEGR Rad Hard Power NMOS 100V, 25A, 0.07Ω TO-254AA	3971
N	FSF250D1	2N7406D	SEGR Rad Hard Power NMOS 200V, 24A, 0.11Ω TO-254AA	4046
N	FSF250R1	2N7406R	SEGR Rad Hard Power NMOS 200V, 24A, 0.11Ω TO-254AA	4046
C	FSF250R3	2N7406R	SEGR Rad Hard Power NMOS 200V, 24A, 0.11Ω TO-254AA	4046
C	FSF250R4	JANSR2N7406	SEGR Rad Hard Power NMOS 200V, 24A, 0.11Ω TO-254AA	4046
N	FSF254D1	2N7407D	SEGR Rad Hard Power NMOS 250V,18A, 0.17Ω TO-254AA	3972
N	FSF254R1	2N7407R	SEGR Rad Hard Power NMOS 250V,18A, 0.17Ω TO-254AA	3972
C	FSF254R3	2N7407R	SEGR Rad Hard Power NMOS 250V,18A, 0.17Ω TO-254AA	3972

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	FSF254R4	JANSR2N7407	SEGR Rad Hard Power NMOS 250V,18A, 0.17Ω TO-254AA	3972
N	FSF450D1	2N7408D	SEGR Rad Hard Power NMOS 500V, 9A, 0.60Ω TO-254AA	3970
N	FSF450R1	2N7408R	SEGR Rad Hard Power NMOS 500V, 9A, 0.60Ω TO-254AA	3970
C	FSF450R3	2N7408R	SEGR Rad Hard Power NMOS 500V, 9A, 0.60Ω TO-254AA	3970
C	FSF450R4	JANSR2N7408	SEGR Rad Hard Power NMOS 500V, 9A, 0.60Ω TO-254AA	3970
N	FSF9150D1	2N7403D	SEGR Rad Hard Power PMOS 100V, 22A, 0.14Ω TO-254AA	4089
N	FSF9150R1	2N7403R	SEGR Rad Hard Power PMOS 100V, 22A, 0.14Ω TO-254AA	4089
C	FSF9150R3	2N7403R	SEGR Rad Hard Power PMOS 100V, 22A, 0.14Ω TO-254AA	4089
C	FSF9150R4	JANSR2N7403	SEGR Rad Hard Power PMOS 100V, 22A, 0.14Ω TO-254AA	4089
N	FSF9250D1	2N7403D	SEGR Rad Hard Power PMOS 200V, 15A, 0.29Ω TO-254AA	4090
N	FSF9250R1	2N7403R	SEGR Rad Hard Power PMOS 200V, 15A, 0.29Ω TO-254AA	4090
C	FSF9250R3	2N7403R	SEGR Rad Hard Power PMOS 200V, 15A, 0.29Ω TO-254AA	4090
C	FSF9250R4	JANSR2N7403	SEGR Rad Hard Power PMOS 200V, 15A, 0.29Ω TO-254AA	4090
N	FSL130D1	2N7395D	SEGR Rad Hard Power NMOS 100V, 8A, 0.23Ω TO-205AF	4031
N	FSL130R1	2N7395R	SEGR Rad Hard Power NMOS 100V, 8A, 0.23Ω TO-205AF	4031
C	FSL130R3	2N7395R	SEGR Rad Hard Power NMOS 100V, 8A, 0.23Ω TO-205AF	4031
C	FSL130R4	JANSR2N7395	SEGR Rad Hard Power NMOS 100V, 8A, 0.23Ω TO-205AF	4031
N	FSL230D1	2N7396D	SEGR Rad Hard Power NMOS 200V, 5A, 0.46Ω TO-205AF	4032
N	FSL230R1	2N7396R	SEGR Rad Hard Power NMOS 200V, 5A, 0.46Ω TO-205AF	4032
C	FSL230R3	2N7396R	SEGR Rad Hard Power NMOS 200V, 5A, 0.46Ω TO-205AF	4032
C	FSL230R4	JANSR2N7396	SEGR Rad Hard Power NMOS 200V, 5A, 0.46Ω TO-205AF	4032
N	FSL234D1	2N7397D	SEGR Rad Hard Power NMOS 250V, 4A, 0.61Ω TO-205AF	4030
N	FSL234R1	2N7397R	SEGR Rad Hard Power NMOS 250V, 4A, 0.61Ω TO-205AF	4030
C	FSL234R3	2N7397R	SEGR Rad Hard Power NMOS 250V, 4A, 0.61Ω TO-205AF	4030
C	FSL234R4	JANSR2N7397	SEGR Rad Hard Power NMOS 250V, 4A, 0.61Ω TO-205AF	4030
N	FSL430D1	2N7398D	SEGR Rad Hard Power NMOS 500V, 2A, 2.50Ω TO-205AF	4010
N	FSL430R1	2N7398R	SEGR Rad Hard Power NMOS 500V, 2A, 2.50Ω TO-205AF	4010
C	FSL430R3	2N7398R	SEGR Rad Hard Power NMOS 500V, 2A, 2.50Ω TO-205AF	4010
C	FSL430R4	JANSR2N7398	SEGR Rad Hard Power NMOS 500V, 2A, 2.50Ω TO-205AF	4010
N	FSL9130D1		SEGR Rad Hard Power PMOS 100V, 5A, 0.68Ω TO-205AF	4083
N	FSL9130R1		SEGR Rad Hard Power PMOS 100V, 5A, 0.68Ω TO-205AF	4083
C	FSL9130R3		SEGR Rad Hard Power PMOS 100V, 5A, 0.68Ω TO-205AF	4083
N	FSL9130R4		SEGR Rad Hard Power PMOS 100V, 5A, 0.68Ω TO-205AF	4083
N	FSL9230D1		SEGR Rad Hard Power PMOS 200V, 3A, 1.50Ω TO-205AF	4084
N	FSL9230R1		SEGR Rad Hard Power PMOS 200V, 3A, 1.50Ω TO-205AF	4084
C	FSL9230R3		SEGR Rad Hard Power PMOS 200V, 3A, 1.50Ω TO-205AF	4084
N	FSL9230R4		SEGR Rad Hard Power PMOS 200V, 3A, 1.50Ω TO-205AF	4084
N	FSS130D1	2N7399D	SEGR Rad Hard Power NMOS 100V, 11A, 0.21Ω TO-257AA	4059
N	FSS130R1	2N7399R	SEGR Rad Hard Power NMOS 100V, 11A, 0.21Ω TO-257AA	4059
C	FSS130R3	2N7399R	SEGR Rad Hard Power NMOS 100V, 11A, 0.21Ω TO-257AA	4059
C	FSS130R4	JANSR2N7399	SEGR Rad Hard Power NMOS 100V, 11A, 0.21Ω TO-257AA	4059
N	FSS230D1	2N7400D	SEGR Rad Hard Power NMOS 200V, 8A, 0.44Ω TO-257AA	4054
N	FSS230R1	2N7400R	SEGR Rad Hard Power NMOS 200V, 8A, 0.44Ω TO-257AA	4054
C	FSS230R3	2N7400R	SEGR Rad Hard Power NMOS 200V, 8A, 0.44Ω TO-257AA	4054
C	FSS230R4	JANSR2N7400	SEGR Rad Hard Power NMOS 200V, 8A, 0.44Ω TO-257AA	4054
N	FSS234D1	2N7401D	SEGR Rad Hard Power NMOS 250V, 6A, 0.60Ω TO-257AA	4053
C	FSS234R1	JANSR2N7401	SEGR Rad Hard Power NMOS 250V, 6A, 0.60Ω TO-257AA	4053
C	FSS234R3	2N7401R	SEGR Rad Hard Power NMOS 250V, 6A, 0.60Ω TO-257AA	4053
C	FSS234R4	2N7401R	SEGR Rad Hard Power NMOS 250V, 6A, 0.60Ω TO-257AA	4053
N	FSS430D1	2N7401D	SEGR Rad Hard Power NMOS 500V, 3A, 2.70Ω TO-257AA	4060

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	FSS430R1	2N7401R	SEGR Rad Hard Power NMOS 500V, 3A, 2.70Ω TO-257AA	4060
C	FSS430R3	2N7402R	SEGR Rad Hard Power NMOS 500V, 3A, 2.70Ω TO-257AA	4060
c	FSS430R4	2JANSRN7402	SEGR Rad Hard Power NMOS 500V, 3A, 2.70Ω TO-257AA	4060
N	FSS9130D1		SEGR Rad Hard Power PMOS 100V, 6A, 0.66Ω TO-257AA	4082
N	FSS9130R1		SEGR Rad Hard Power PMOS 100V, 6A, 0.66Ω TO-257AA	4082
C	FSS9130R3		SEGR Rad Hard Power PMOS 100V, 6A, 0.66Ω TO-257AA	4082
N	FSS9130R4		SEGR Rad Hard Power PMOS 100V, 6A, 0.66Ω TO-257AA	4082
N	FSS9230D1		SEGR Rad Hard Power PMOS 200V, 4A, 1.60Ω TO-257AA	4081
N	FSS9230R1		SEGR Rad Hard Power PMOS 200V, 4A, 1.60Ω TO-257AA	4081
C	FSS9230R3		SEGR Rad Hard Power PMOS 200V, 4A, 1.60Ω TO-257AA	4081
N	FSS9230R4		SEGR Rad Hard Power PMOS 200V, 4A, 1.60Ω TO-257AA	4081
C	GP511K1RZ	5962R9673601VXC	Rad Hard CMOS 8-Bit Bidirectional CMOS/TTL Converter	4128
N	HA1-2400-8	5962-8778301EA	Programmable Op Amp 4-Channel, 16 Lead CERDIP	2891
C	HA1-2400/883	5962-8778301EA	Programmable Op Amp 4-Channel, 16 Lead CERDIP	3926
N	HA1-2420-8	8001601CA	Fast Sample/Hold Amplifier, 14 Lead CERDIP	2856
C	HA1-2420/883	8001601CA	Fast Sample/Hold Amplifier, 14 Lead CERDIP	-
C	HA1-2444/883	5962-9309501MEA	Selectable, 4-Channel Video Op Amp	3608
N	HA1-2539-8	5962-8778701CA	High Slew Rate Op Amp (600V/ms), 14 Lead CERDIP	2896
C	HA1-2539/883	5962-8778701CA	High Slew Rate Op Amp (600V/ms), 14 Lead CERDIP	3927
N	HA1-2540-8	5962-8964801CA	High Slew Rate Fast Setting Op Amp (400V/µs)	2897
C	HA1-2540/883	5962-8964801CA	High Slew Rate Fast Setting Op Amp (400V/µs)	-
N	HA1-2541-8	5962-8778501CA	High Slew Rate Unity Gain Stable Op Amp	2898
N	HA1-2542-8		High Slew Rate High Output Current Op Amp	2899
C	HA1-2546/883	5962-9325101MEA	Wideband, Two Quadrant Analog Multiplier	2444
C	HA1-2556/883		Wideband 4-Quadrant Voltage Output Analog MUX	3619
C	HA1-2557/883		Wideband 4-Quadrant Current Output Analog MUX	3638
N	HA1-2700-8		General Purpose Op Amp	-
C	HA1-2839/883		High Slew Rate Op Amp (600V/µs), 14 Lead CERDIP	3593
C	HA1-2840/883	5962-9467901CA	High Slew Rate Fast Settling (400V/µs)	3594
C	HA1-2841/883	5962-8778503CA	Wideband, Fast Settling, Unity Gain Stable	3621
C	HA1-2842/883		Wideband High Output Current Video Op Amp	3622
C	HA1-2850/883		High Slew Rate Fast Settling (340V/µs)	3595
C	HA1-4741/883		Quad General Purpose Op Amp	3704
N	HA1-4900-8		Precision Quad Comparator, 16 Lead CERDIP	2855
N	HA1-4902-8	5962-8686001EA	Precision Quad Comparator, 16 Lead CERDIP	2855
C	HA1-4902/883	5962-8686001EA	Precision Quad Comparator, 16 Lead CERDIP	3929
C	HA1-5004/883		Current Feedback Amplifier, 14 Lead CERDIP	3706
C	HA1-5104/883	5962-8850201CA	Quad Low Noise Op Amp, 14 Lead CERDIP	3710
C	HA1-5114/883	5962-8963401CA	Quad Low Noise Op Amp, 14 Lead CERDIP	3712
C	HA1-5134/883	5962-9455301MCA	Precision Quad Op Amp, 14 Lead CERDIP	3713
C	HA1-5144/883	5962-8965603CA	Quad Ultra Low Power Op Amp	3934
N	HA1-5190-8	5962-88778401CA	Fast Settling Op Amp, 14 Lead CERDIP	2914
C	HA1-5190/883	5962-88778401CA	Fast Settling Op Amp, 14 Lead CERDIP	2914
N	HA1-5320-8	5962-9306302MCA	High Speed Precision Sample/Hold, 14 Lead CERDIP	2857
C	HA1-5320/883	5962-9306302MCA	High Speed Precision Sample/Hold, 14 Lead CERDIP	2927
C	HA1-5330/883	5962-8767701CA	High Speed Sample/Hold Amplifier, 14 Lead CERDIP	3935
C	HA1-5340/883	5962-9306301MCA	High Speed Low Distortion Sample/Hold	2452
C	HA2-2500	JM38510/12204BGA	Ref Only	2890
N	HA2-2500-8	HA2-2500/883	Withdraw Date 9/30/95; See Ref P/N.	2890
C	HA2-2500/883		Precision High Slew Rate Op Amp 30V/µs	3734

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	HA2-2502-8	HA2-2502/883	Precision High Slew Rate Op Amp 8/(TO-99)	2890
C	HA2-2502/883		Precision High Slew Rate Op Amp 8/(TO-99)	3734
C	HA2-2510	JM38510/12205BGA	Ref Only	2893
N	HA2-2510-8	HA2-2510/883	High Slew Rate Op Amp (60V/µs) 8/(TO-99)	2893
C	HA2-2510/883		High Slew Rate Op Amp (60V/µs) 8/(TO-99)	3697
C	HA2-2512/883		High Slew Rate Op Amp (60V/µs) 8/(TO-99)	3697
C	HA2-2520	JM38510/12206BGA	Ref Only	2894
N	HA2-2520-8	5962-8988001G	High Slew Rate Op Amp (120V/µs) 8/(TO-99)	2894
C	HA2-2520/883	5962-8988002G	High Slew Rate Op Amp (120V/µs) 8/(TO-99)	3735
N	HA2-2522-8	5962-8988001G	Uncompensated High Slew Rate Op Amp, 120V	2894
C	HA2-2522/883	5962-8988001G	Uncompensated High Slew Rate Op Amp, 120V	3735
C	HA2-2529/883	5962-8972101G	Uncompensated High Slew Rate Op Amp, 160V	3736
N	HA2-2541-8	5962-8778501XA	Withdraw Date 9/30/95; See Ref P/N.	2898
C	HA2-2541/883	5962-8778501XA	Wideband Unity Gain Stable Op Amp, 280V/ms	3698
C	HA2-2542/883	5962-8964301XA	Wideband High Output Current Op Amp 12/(TO-99)	3928
C	HA2-2544/883	5962-8950201G	Video Operational Amp 8/(TO-99)Can	3699
C	HA2-2548/883		Precision High Speed Op Amp 8 (TO-99)Can	2472
C	HA2-2600	JM38510/12202BGA	Ref Only	2902
N	HA2-2600-8	HA2-2600/883	High Slew Rate Op Amp (30V/µs), 8 Pin	2902
C	HA2-2600/883		High Slew Rate Op Amp (30V/µs), 8 Pin	3700
N	HA2-2602-8	HA2-2602/883	High Slew Rate Op Amp (30V/µs), 8 Pin	2902
C	HA2-2602/883		High Slew Rate Op Amp (30V/µs), 8 Pin	3700
C	HA2-2620	JM38510/12203BGA	Ref Only	2903
N	HA2-2620-8	HA2-2620/883	Wideband Uncompensated Amp, 8/(TO-99) Can	2903
C	HA2-2620/883		Wideband Uncompensated Amp, 8/(TO-99) Can	3701
N	HA2-2622-8	HA2-2622/883	Wideband Uncompensated Amp, 8/(TO-99) Can	2903
C	HA2-2622/883		Wideband Uncompensated Amp, 8/(TO-99) Can	3701
C	HA2-2640/883	7800302G	High Voltage Op Amp (±40V/µs)	3702
N	HA2-5002-8	5962-8963601G	Wideband High Slew Rate Buffer 8/(TO-99)	2921
C	HA2-5002/883	5962-8963601G	Wideband High Slew Rate Buffer 8/(TO-99)	3705
N	HA2-5033-8	5962-8963301X	Video Buffer 12/(TO-8)Can	2924
C	HA2-5033/883	5962-8963301X	Video Buffer 12/(TO-8)Can	3930
C	HA2-5101/883	5962-8963501G	Single Low Noise High Performance Op Amp	3931
C	HA2-5102/883	5962-8954801G	Dual Low Noise High Performance Op Amp	3709
C	HA2-5111	5962-8963101G	Single Low Noise High Performance 8/(TO-8)	3932
C	HA2-5112/883	5962-8963201G	Dual Low Noise High Performance Op Amp	3711
C	HA2-5127/883	5962-8962701G	Precision Op Amp (OP27)	3751
N	HA2-5130-8		Precision Op Amp	2907
C	HA2-5135/883		Precision Op Amp	3731
C	HA2-5137/883	5962-8962702G	Low Noise Precision Op Amp 8/(TO-99) Can	3714
C	HA2-5142/883	5962-8965602G	Dual Ultra Low Power Op Amp	3732
N	HA2-5160-8		Wideband JFET Input Op Amp, 8/(TO-99) Can	2911
C	HA2-5177/883		Precision Op Amp	3733
N	HA2-5190-8	5962-8778401X	Wideband Fast Settling Op Amp, 12/(TO-8)	2914
C	HA2-5190/883	5962-8778401X	Wideband Fast Settling Op Amp, 12/(TO-8)	-
C	HA4-2400/883	5962-87783012A	Programmable Op Amp 4-Channel Dig, 20 Lead LCC	3926
C	HA4-2420/883	80016012A	Fast Sample/Hold Amplifier, 20 Lead LCC	-
C	HA4-2522/883	5962-89880012A	High Slew Rate Op Amp (120V/µs), 20 Lead LCC	3735
C	HA4-2529	5962-89721012A	Ref Only	2895
C	HA4-2539/883	5962-87787012A	High Slew Rate Op Amp (600V/µs), 20 Lead LCC	3927

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HA4-2540/883	5962-89648012A	High Slew Rate Op Amp (400V/µs), 20 Lead LCC	-
C	HA4-2544/883	5962-89502012A	High Slew Rate Op Amp (160V/µs), 20 Lead LCC	3699
C	HA4-2546/883	5962-9325101M2A	High Speed Analog Multiplier, 20 Lead LCC	2444
C	HA4-2640/883	78003022A	High Voltage Op Amp	3702
C	HA4-4741/883		Quad General Purpose Op Amp	3704
C	HA4-4902/883	5962-86860012A	Quad Comparator, 20 Lead LCC	3929
C	HA4-5002/883	5962-89636012A	High Slew Rate Buffer, 20 Lead LCC	3705
C	HA4-5020/883	5962-89620012A	Current Feedback Op Amp, 20 Lead LCC	3541
C	HA4-5101/883	5962-89635012A	Low Noise Op Amp, 20 Lead LCC	3931
C	HA4-5102/883	5962-89548012A	Dual Low Noise Op Amp, 20 Lead LCC	3709
C	HA4-5104/883	5962-88502012A	Quad Low Noise Op Amp, 20 Lead LCC	3710
C	HA4-5111/883	5962-89631012A	Low Noise Op Amp, 20 Lead LCC	3932
C	HA4-5112/883	5962-89632012A	Dual Low Noise Op Amp, 20 Lead LCC	3711
C	HA4-5114/883	5962-89634012A	Quad Low Noise Op Amp, 20 Lead LCC	3712
C	HA4-5127/883	5962-89627012A	Precision Op Amp (OP27)	3751
C	HA4-5134/883	5962-9455301M2A	Quad Precision Op Amp	3713
C	HA4-5135/883		Precision Op Amp	3731
C	HA4-5137/883	5962-89627002A	Precision Op Amp (OP37), 20 Lead LCC	3714
C	HA4-5142/883	5962-89656022A	Dual Ultra Low Power Op Amp	3732
C	HA4-5144/883	5962-89656032A	Quad Ultra Low Power Op Amp	3934
C	HA4-5147/883	5962-89627032A	Precision Op Amp (OP47), 20 Lead LCC	3715
C	HA4-5177/883		Precision Op Amp	3733
C	HA4-5190/883	5962-87784012A	Fast Settling Op Amp, 20 Lead LCC	-
C	HA4-5221/883	5962-9163401M2A	High Performance Wideband Op Amp, 20 Lead LCC	3716
C	HA4-5222/883	5962-9163402M2A	Withdraw Date 9/30/95; See Ref P/N.	3717
N	HA4-5320-8	5962-9306302M2A	High Speed Sample/Hold Amplifier, 20 Lead LCC	2857
C	HA4-5320/883	5962-9306302M2A	High Speed Sample/Hold Amplifier	2927
C	HA4-5330/883	5962-87677012A	500ns Sample/Hold Amp, 20 Lead LCC	3935
C	HA4-5340/883	5962-9306301M2A	High Speed Sample/Hold, 20 Lead LCC	2452
C	HA5022MJ/883		Dual 100MHz Op Amp, With Disable	3729
C	HA5023MJ/883		Dual 100MHz Op Amp, 8 Lead CERDIP	3730
C	HA7-2500	JM38510/12204BPA	Ref Only	2890
C	HA7-2500/883		Precision High Slew Rate Op Amp (30V/µs)	3734
C	HA7-2510	JM38510/12205BPA	Ref Only	2893
N	HA7-2510-8	HA7-2510/883	High Slew Rate Op Amp (60V/ms) 8 Lead CERDIP	2893
C	HA7-2510/883		High Slew Rate Op Amp (60V/ms) 8 Lead CERDIP	3697
C	HA7-2512/883	HA7-2510/883	Withdraw Date 9/30/95; See Ref Substitute P/N.	3697
C	HA7-2520	JM38510/12206BPA	Ref Only	2894
N	HA7-2520-8	5962-8988002PA	Uncompensated High Slew Rate Op Amp (120V/µs)	2894
C	HA7-2520/883	5962-8988002PA	Uncompensated High Slew Rate Op Amp (120V/µs)	3735
N	HA7-2522-8	5962-8988001PA	Uncompensated High Slew Rate Op Amp (120V/µs)	2894
C	HA7-2522/883	5962-8988001PA	Uncompensated High Slew Rate Op Amp (120V/µs)	3735
C	HA7-2529/883	5962-8972101PA	Uncompensated High Slew Rate Op Amp (160V/µs)	3736
C	HA7-2544/883	5962-8950201PA	High Slew Rate Op Amp (160V/µs), 8 Lead CERDIP	3699
C	HA7-2548/883		Precision High Speed Op Amp, 8 Lead CERDIP	2472
C	HA7-2600	JM38510/12202BPA	Ref Only	2902
C	HA7-2600/883		Wideband High Impedance Op Amp (30V/µs)	3700
C	HA7-2620	JM38510/12203BPA	Ref Only	2903
N	HA7-2620-8	HA7-2620/883	Wideband Uncompensated Op Amp (60V/µs)	2903
C	HA7-2620/883		Wideband Uncompensated Op Amp (60V/µs)	3701

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	HA7-2622-8	HA7-2622/883	Wideband Uncompensated Op Amp (60V/µs)	2903
C	HA7-2622/883		Wideband Uncompensated Op Amp (60V/µs)	3701
C	HA7-2640/883	7800302PA	High Voltage Op Amp (±40V/µs)	3702
C	HA7-2840/883	5962-9467901MPA	High Slew Rate Op Amp (400V/µs), 8 Lead CERDIP	3594
C	HA7-2841/883	5962-8778503PA	Wideband Fast Setting Unity Gain Stable Op Amp	3621
C	HA7-2842/883	5962-9469401MPA	Wideband High Output Current Video Op Amp	3622
C	HA7-2850/883		Wideband Op Amp, 8 Lead CERDIP	3595
C	HA7-5002-8	5962-8963601PA	High Slew Rate Buffer, 8 Lead CERDIP	2921
C	HA7-5002/883	5962-8963601PA	High Slew Rate Buffer, 8 Lead CERDIP	3705
C	HA7-5020/883	5962-8962001PA	100MHz Current Feedback Amp, 8 Lead CERDIP	3541
C	HA7-5101/883	5962-8963501PA	Single Low Noise High Performance Op Amp	3931
C	HA7-5102/883	5962-8954801PA	Dual Low Noise High Performance Op Amp	3709
C	HA7-5111/883	5962-8963101PA	Withdraw Date 9/30/95; See Ref P/N.	3932
C	HA7-5112/883	5962-8963201PA	Dual Low Noise High Performance Op Amp	3711
C	HA7-5127/883	5962-8962701PA	Precision Op Amp (OP27)	3751
C	HA7-5135/883		Precision Op Amp	3731
C	HA7-5137/883	5962-8962702PA	Low Noise Precision Op Amp, 8 Lead CERDIP	3714
C	HA7-5142/883	5962-8965602PA	Dual Ultra Low Power Op Amp	3732
C	HA7-5147/883	5962-8962703PA	Ultra Low Noise Wideband Amp, 8 Lead CERDIP	3715
N	HA7-5170-8		Low Bias JFET Input Op Amp	2912
C	HA7-5177/883		Precision Op Amp	3733
C	HA7-5221/883	5962-9163401MPA	High Performance Wideband Op Amp, 8 Lead CERDIP	3716
C	HA7-5222/883	5962-9163402MPA	Dual Wide Band Operational Amp, 8 Lead CERDIP	3717
C	HCS00DMSR	5962R9572401VCC	Rad Hard Quad 2-Input NAND Gate	2138
C	HCS00KMSR	5962R9572401VXC	Rad Hard Quad 2-Input NAND Gate	2138
C	HCS02DMSR	5962R9568201VCC	Rad Hard Quad 2-Input NOR Gate	2433
C	HCS02KMSR	5962R9568201VXC	Rad Hard Quad 2-Input NOR Gate	2433
C	HCS04DMSR	5962R9572501VCC	Rad Hard Hex Inverter	3046
C	HCS04KMSR	5962R9572501VXC	Rad Hard Hex Inverter	3046
C	HCS05DMSR	5962R9580101VCC	Rad Hard Hex Inverter, Open Drain Outputs	3557
C	HCS05KMSR	5962R9580101VXC	Rad Hard Hex Inverter, Open Drain Outputs	3557
C	HCS08DMSR	5962R9568001VCC	Rad Hard Quad 2-Input AND Gate	3047
C	HCS08KMSR	5962R9568001VXC	Rad Hard Quad 2-Input AND Gate	3047
C	HCS109DMSR	5962R9578401VEC	Rad Hard Dual J-K Flip-Flop	2466
C	HCS109KMSR	5962R9578401VXC	Rad Hard Dual J-K Flip-Flop	2466
C	HCS10DMSR	5962R9577701VCC	Rad Hard Triple 3-Input NAND Gate	2435
C	HCS10KMSR	5962R9577701VXC	Rad Hard Triple 3-Input NAND Gate	2435
C	HCS112DMSR	5962R9580201VEC	Rad Hard Dual J-K Flip-Flop With Set and Reset	3558
C	HCS112KMSR	5962R9580201VXC	Rad Hard Dual J-K Flip-Flop With Set and Reset	3558
C	HCS11DMSR	5962R9572001VCC	Rad Hard Triple 3-Input AND Gate	3048
C	HCS11KMSR	5962R9572001VXC	Rad Hard Triple 3-Input AND Gate	3048
C	HCS125DMSR	5962R9580301VCC	Rad Hard Quad Buffer, Three-State	3559
C	HCS125KMSR	5962R9580301VXC	Rad Hard Quad Buffer, Three-State	3559
C	HCS132DMSR	5962R9572601VEC	Rad Hard Quad 2-Input NAND Schmitt Trigger	3061
C	HCS132KMSR	5962R9572601VXC	Rad Hard Quad 2-Input NAND Schmitt Trigger	3061
C	HCS138DMSR	5962R9572701VEC	Rad Hard Inverting 3-to-8-Line Decoder/DeMUX	2473
C	HCS138KMSR	5962R9572701VXC	Rad Hard Inverting 3-to-8-Line Decoder/DeMUX	2473
C	HCS139DMSR	5962R9580401VEC	Rad Hard Dual 2-to-4-Line Decoder/DeMUX	3560
C	HCS139KMSR	5962R9580401VXC	Rad Hard Dual 2-to-4-Line Decoder/DeMUX	3560
C	HCS14DMSR	5962R9568101VCC	Rad Hard Hex Inverting Schmitt Trigger	3049

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HCS14KMSR	5962R9568101VXC	Rad Hard Hex Inverting Schmitt Trigger	3049
C	HCS151DMSR	5962R9572801VEC	Rad Hard 8-Input MUX	3077
C	HCS151KMSR	5962R9572801VXC	Rad Hard 8-Input MUX	3077
C	HCS154DMSR	5962R9572901VJC	Rad Hard 4-to-16-Line Decoder/DeMUX	2479
C	HCS154KMSR	5962R9572901VXC	Rad Hard 4-to-16-Line Decoder/DeMUX	2479
C	HCS157DMSR	5962R9580501VEC	Rad Hard Quad 2-Input MUX	3561
C	HCS157KMSR	5962R9580501VXC	Rad Hard Quad 2-Input MUX	3561
C	HCS160DMSR	5962R9580601VEC	Rad Hard Sync. BCD Decade Counter, Async. Channel Reset	2296
C	HCS160KMSR	5962R9580601VXC	Rad Hard Sync. BCD Decade Counter, Async. Channel Reset	2296
C	HCS161DMSR	5962R9573001VEC	Rad Hard Synchronous 4-Bit Binary Counter	2469
C	HCS161KMSR	5962R9573001VXC	Rad Hard Synchronous 4-Bit Binary Counter	2469
C	HCS163DMSR	5962R9580701VEC	Rad Hard Synchronous 4-Bit Binary Counter, Synchronous Reset	3087
C	HCS163KMSR	5962R9580701VXC	Rad Hard Synchronous 4-Bit Binary Counter, Synchronous Reset	3087
C	HCS164DMSR	5962R9578501VCC	Rad Hard 8-Bit Serial-In/Parallel-Out Shift Register	2465
C	HCS164KMSR	5962R9578501VXC	Rad Hard 8-Bit Serial-In/Parallel-Out Shift Register	2465
C	HCS165DMSR	5962R9578601VEC	Rad Hard 8-Bit Parallel-In/Serial-Out Shift Register	2481
C	HCS165KMSR	5962R9578601VXC	Rad Hard 8-Bit Parallel-In/Serial-Out Shift Register	2481
C	HCS166DMSR	5962R9578701VEC	Rad Hard 8-Bit Parallel-In/Serial-Out Shift Register	2482
C	HCS166KMSR	5962R9578701VXC	Rad Hard 8-Bit Parallel-In/Serial-Out Shift Register	2482
C	HCS190DMSR	5962R9580801VEC	Rad Hard Synchronous 4-Bit Up/Down BCD Counter	2251
C	HCS190KMSR	5962R9580801VXC	Rad Hard Synchronous 4-Bit Up/Down BCD Counter	2251
C	HCS193DMSR	5962R9578801VEC	Rad Hard Synchronous 4-Bit Up/Down BCD Counter	3065
C	HCS193KMSR	5962R9578801VXC	Rad Hard Synchronous 4-Bit Up/Down BCD Counter	3065
C	HCS195DMSR	5962R9578901VEC	Rad Hard 4-Bit Parallel Access Shift Register	3385
C	HCS195KMSR	5962R9578901VXC	Rad Hard 4-Bit Parallel Access Shift Register	3385
C	HCS20DMSR	5962R9577801VCC	Rad Hard Dual 4-Input NAND Gate	3050
C	HCS20KMSR	5962R9577801VXC	Rad Hard Dual 4-Input NAND Gate	3050
C	HCS21DMSR	5962R9577901VCC	Rad Hard Dual 4-Input AND Gate	3052
C	HCS21KMSR	5962R9577901VXC	Rad Hard Dual 4-Input AND Gate	3052
C	HCS240DMSR	5962R9580901VRC	Rad Hard Octal Buffer/Line Driver, Three-State, Inverting	3562
C	HCS240KMSR	5962R9580901VXC	Rad Hard Octal Buffer/Line Driver, Three-State, Inverting	3562
C	HCS241DMSR	5962R9581001VRC	Rad Hard Octal Buffer/Line Driver, Three-State	3122
C	HCS241KMSR	5962R9581001VXC	Rad Hard Octal Buffer/Line Driver, Three-State	3122
C	HCS244DMSR	5962R9573101VCC	Rad Hard Octal Buffer/Line Driver	2132
C	HCS244KMSR	5962R9573101VXC	Rad Hard Octal Buffer/Line Driver	2132
C	HCS245DMSR	5962R9679701VRC	Rad Hard Octal Bus Transceiver, Three-State	2468
C	HCS245KMSR	5962R9679701VXC	Rad Hard Octal Bus Transceiver, Three-State	2468
C	HCS253DMSR	5962R9579001VEC	Rad Hard Dual 4-Input MUX, Three-State	3068
C	HCS253KMSR	5962R9579001VXC	Rad Hard Dual 4-Input MUX, Three-State	3068
C	HCS273DMSR	5962R9579101VRC	Rad Hard Octal D-Type Flip-Flop With Reset	2475
C	HCS273KMSR	5962R9579101VXC	Rad Hard Octal D-Type Flip-Flop With Reset	2475
C	HCS27DMSR	5962R9578001VCC	Rad Hard Triple 3-Input NOR Gate	3054
C	HCS27KMSR	5962R9578001VXC	Rad Hard Triple 3-Input NOR Gate	3054
C	HCS283DMSR	5962R9581101VEC	Rad Hard 4-Bit Full Adder	-
C	HCS283KMSR	5962R9581101VXC	Rad Hard 4-Bit Full Adder	-
C	HCS32DMSR	5962R9578101VCC	Rad Hard Quad 2-Input OR Gate	3057
C	HCS32KMSR	5962R9578101VXC	Rad Hard Quad 2-Input OR Gate	3057
C	HCS373DMSR	5962R9579201VRC	Rad Hard Transparent Latch, Three-State	2135
C	HCS373KMSR	5962R9579201VXC	Rad Hard Transparent Latch, Three-State	2135
C	HCS374DMSR	5962R9579301VRC	Rad Hard Octal D-Type Flip-Flop, Positive Edge Trigger	2470

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HCS374KMSR	5962R9579301VXC	Rad Hard Octal D-Type Flip-Flop, Positive Edge Trigger	2470
C	HCS573DMSR	5962R9579401VRC	Rad Hard Octal Transparent Latch, Three-State	4056
C	HCS573KMSR	5962R9579401VXC	Rad Hard Octal Transparent Latch, Three-State	4056
C	HCS74DMSR	5962R9578201VCC	Rad Hard Dual-D Flip-Flop w/ Set/Reset, Positive Edge Trigger	2142
C	HCS74KMSR	5962R9578201VXC	Rad Hard Dual-D Flip-Flop w/ Set/Reset, Positive Edge Trigger	2142
C	HCS86DMSR	5962R9578301VCC	Rad Hard Quad 2-Input Exclusive OR Gate	3058
C	HCS86KMSR	5962R9578301VXC	Rad Hard Quad 2-Input Exclusive OR Gate	3058
C	HCTS00DMSR	5962R9563701VCC	Rad Hard Quad 2-Input NAND Gate	2139
C	HCTS00KMSR	5962R9563701VXC	Rad Hard Quad 2-Input NAND Gate	2139
C	HCTS02DMSR	5962R9567901VCC	Rad Hard Quad 2-Input NOR Gate	2137
C	HCTS02KMSR	5962R9567901VXC	Rad Hard Quad 2-Input NOR Gate	2137
C	HCTS04DMSR	5962R9573201VCC	Rad Hard Hex Inverter	2140
C	HCTS04KMSR	5962R9573201VXC	Rad Hard Hex Inverter	2140
C	HCTS08DMSR	5962R9568301VCC	Rad Hard Quad 2-Input AND Gate	2136
C	HCTS08KMSR	5962R9568301VXC	Rad Hard Quad 2-Input AND Gate	2136
C	HCTS109DMSR	5962R9576901VEC	Rad Hard J-K Flip-Flop With Set and Reset	2141
C	HCTS109KMSR	5962R9576901VXC	Rad Hard J-K Flip-Flop With Set and Reset	2141
C	HCTS10DMSR	5962R9576501VCC	Rad Hard Triple 3-Input NAND Gate	2434
C	HCTS10KMSR	5962R9576501VXC	Rad Hard Triple 3-Input NAND Gate	2434
C	HCTS112DMSR	5962R9573801VEC	Rad Hard Dual J-K Flip-Flop With Set and Reset	2467
C	HCTS112KMSR	5962R9573801VXC	Rad Hard Dual J-K Flip-Flop With Set and Reset	2467
C	HCTS11DMSR	5962R9572101VCC	Rad Hard Triple 3-Input AND Gate	2409
C	HCTS11KMSR	5962R9572101VXC	Rad Hard Triple 3-Input AND Gate	2409
C	HCTS132DMSR	5962R9573901VCC	Rad Hard Quad 2-Input NAND Schmitt Trigger	3062
C	HCTS132KMSR	5962R9573901VXC	Rad Hard Quad 2-Input NAND Schmitt Trigger	3062
C	HCTS138DMSR	5962R9574001VEC	Rad Hard Inverting 3-to-8-Line Decoder/DeMUX	2462
C	HCTS138KMSR	5962R9574001VXC	Rad Hard Inverting 3-to-8-Line Decoder/DeMUX	2462
C	HCTS139DMSR	5962R9575301VEC	Rad Hard Dual 2-to-4-Line Decoder/DeMUX	2231
C	HCTS139KMSR	5962R9575301VXC	Rad Hard Dual 2-to-4-Line Decoder/DeMUX	2231
C	HCTS147DMSR	5962R9574101VEC	Rad Hard 10-to-4 Line Priority Encoder	3063
C	HCTS147KMSR	5962R9574101VXC	Rad Hard 10-to-4 Line Priority Encoder	3063
C	HCTS14DMSR	5962R9571901VCC	Rad Hard Hex Inverter Schmitt Trigger	3205
C	HCTS14KMSR	5962R9571901VXC	Rad Hard Hex Inverter Schmitt Trigger	3205
C	HCTS153DMSR	5962R9575401VEC	Rad Hard Dual 4-Input MUX	2463
C	HCTS153KMSR	5962R9575401VXC	Rad Hard Dual 4-Input MUX	2463
C	HCTS157DMSR	5962R9575501VEC	Rad Hard Quad 2-Input MUX	2464
C	HCTS157KMSR	5962R9575501VXC	Rad Hard Quad 2-Input MUX	2464
C	HCTS160DMSR	5962R9574201VEC	Rad Hard Synchronous BCD Decade Counter	2484
C	HCTS160KMSR	5962R9574201VXC	Rad Hard Synchronous BCD Decade Counter	2484
C	HCTS161ADMSR	5962R9577001VEC	Rad Hard Synchronous 4-Bit Binary Counter	2144
C	HCTS161AKMSR	5962R9577001VXC	Rad Hard Synchronous 4-Bit Binary Counter	2144
C	HCTS163DMSR	5962R9574301VEC	Rad Hard Synchronous 4-Bit Binary Counter, Synchronous Reset	2480
C	HCTS163KMSR	5962R9574301VXC	Rad Hard Synchronous 4-Bit Binary Counter, Synchronous Reset	2480
C	HCTS164DMSR	5962R9566301VCC	Rad Hard 8-Bit Serial-In/Parallel-Out Shift Register	3386
C	HCTS164KMSR	5962R9566301VXC	Rad Hard 8-Bit Serial-In/Parallel-Out Shift Register	3386
C	HCTS190DMSR	5962R9577101VEC	Rad Hard Synchronous 4-Bit Up/Down BCD Counter	2474
C	HCTS190KMSR	5962R9577101VXC	Rad Hard Synchronous 4-Bit Up/Down BCD Counter	2474
C	HCTS191DMSR	5962R9575601VEC	Rad Hard Synchronous 4-Bit Binary Up/Down Counter	2250
C	HCTS191KMSR	5962R9575601VXC	Rad Hard Synchronous 4-Bit Binary Up/Down Counter	2250
C	HCTS193DMSR	5962R9575701VEC	Rad Hard Synchronous 4-Bit Binary Up/Down Counter	3066

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HCTS193KMSR	5962R9575701VXC	Rad Hard Synchronous 4-Bit Binary Up/Down Counter	3066
C	HCTS20DMSR	5962R9573301VCC	Rad Hard Dual 4-Input NAND Gate	3051
C	HCTS20KMSR	5962R9573301VXC	Rad Hard Dual 4-Input NAND Gate	3051
C	HCTS21DMSR	5962R9576601VCC	Rad Hard Dual 4-Input AND Gate	3053
C	HCTS21KMSR	5962R9576601VXC	Rad Hard Dual 4-Input AND Gate	3053
C	HCTS240ADMSR	5962R9577201VRC	Rad Hard Octal Buffer/Line Driver, Three-State, Inverting	2105
C	HCTS240AKMSR	5962R9577201VXC	Rad Hard Octal Buffer/Line Driver, Three-State, Inverting	2105
C	HCTS244DMSR	5962R9574401VRC	Rad Hard Octal Buffer/Line Driver, Three-State	2133
C	HCTS244KMSR	5962R9574401VXC	Rad Hard Octal Buffer/Line Driver, Three-State	2133
C	HCTS245DMSR	5962R9574501VRC	Rad Hard Octal Bus Transceiver, Three-State	2360
C	HCTS245KMSR	5962R9574501VXC	Rad Hard Octal Bus Transceiver, Three-State	2360
C	HCTS273DMSR	5962R9576401VCC	Rad Hard Octal D Flip-Flop with Reset	2274
C	HCTS273KMSR	5962R9576401VXC	Rad Hard Octal D Flip-Flop with Reset	2274
C	HCTS27DMSR	5962R9573401VCC	Rad Hard Triple 3-Input NOR Gate	3055
C	HCTS27KMSR	5962R9573401VXC	Rad Hard Triple 3-Input NOR Gate	3055
C	HCTS283DMSR	5962R9577401VEC	Rad Hard 4-Bit Full Adder With Fast Carry	3381
C	HCTS283KMSR	5962R9577401VXC	Rad Hard 4-Bit Full Adder With Fast Carry	3381
C	HCTS299DMSR	5962R9574601VRC	Rad Hard 8-Bit Universal Shift Register, Three-State	3069
C	HCTS299KMSR	5962R9574601VXC	Rad Hard 8-Bit Universal Shift Register, Three-State	3069
C	HCTS30DMSR	5962R9573501VCC	Rad Hard 8-Input NAND Gate	3056
C	HCTS30KMSR	5962R9573501VXC	Rad Hard 8-Input NAND Gate	3056
C	HCTS32DMSR	5962R9573601VCC	Rad Hard Quad 2-Input OR Gate	2248
C	HCTS32KMSR	5962R9573601VXC	Rad Hard Quad 2-Input OR Gate	2248
C	HCTS365DMSR	5962R9577501VEC	Rad Hard Hex Buffer/Line Driver, Three-State	3070
C	HCTS365KMSR	5962R9577501VXC	Rad Hard Hex Buffer/Line Driver, Three-State	3070
C	HCTS373DMSR	5962R9574701VRC	Rad Hard Octal Transparent Latch, Three-State	2131
C	HCTS373KMSR	5962R9574701VXC	Rad Hard Octal Transparent Latch, Three-State	2131
C	HCTS374DMSR	5962R9574801VRC	Rad Hard Octal D-Type Flip-Flop, Positive Edge Trigger	2134
C	HCTS374KMSR	5962R9574801VXC	Rad Hard Octal D-Type Flip-Flop, Positive Edge Trigger	2134
C	HCTS390DMSR	5962R9574901VEC	Rad Hard Dual Decade Ripple Counter	2476
C	HCTS390KMSR	5962R9574901VXC	Rad Hard Dual Decade Ripple Counter	2476
C	HCTS393DMSR	5962R9575001VCC	Rad Hard Dual 4-State Binary Counter	3071
C	HCTS393KMSR	5962R9575001VXC	Rad Hard Dual 4-State Binary Counter	3071
C	HCTS4002DMSR	5962R9576001VCC	Rad Hard Dual 4-Input NOR Gate	3075
C	HCTS4002KMSR	5962R9576001VXC	Rad Hard Dual 4-Input NOR Gate	3075
C	HCTS540DMSR	5962R9577601VRC	Rad Hard Octal Buffer/Line Driver, Three-State	2232
C	HCTS540KMSR	5962R9577601VXC	Rad Hard Octal Buffer/Line Driver, Three-State	2232
C	HCTS541DMSR	5962R9575101VRC	Rad Hard Octal Buffer/Line Driver, Three-State	3073
C	HCTS541KMSR	5962R9575101VXC	Rad Hard Octal Buffer/Line Driver, Three-State	3073
C	HCTS574DMSR	5962R9575801VRC	Rad Hard Octal D-Type Flip-Flop, Positive Edge Trigger	2359
C	HCTS574KMSR	5962R9575801VXC	Rad Hard Octal D-Type Flip-Flop, Positive Edge Trigger	2359
C	HCTS646DMSR	5962R9575901VJC	Rad Hard Octal Bus Transceiver/Register, Three-State	3074
C	HCTS646KMSR	5962R9575901VXC	Rad Hard Octal Bus Transceiver/Register, Three-State	3074
C	HCTS7266DMSR	5962R9575201VCC	Rad Hard Quad 2-Input Exclusive NOR Gate	3384
C	HCTS7266KMSR	5962R9575201VXC	Rad Hard Quad 2-Input Exclusive NOR Gate	3384
C	HCTS74DMSR	5962R9576301VCC	Rad Hard Dual-D Flip-Flop with Set and Reset	2143
C	HCTS74KMSR	5962R9576301VXC	Rad Hard Dual-D Flip-Flop with Set and Reset	2143
C	HCTS75DMSR	5962R9576701VEC	Rad Hard Dual 2-Bit Bistable Transparent Latchable	3189
C	HCTS75KMSR	5962R9576701VXC	Rad Hard Dual 2-Bit Bistable Transparent Latchable	3189
C	HCTS85DMSR	5962R9576801VEC	Rad Hard 4-Bit Magnitude Comparator	3059

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HCTS85KMSR	5962R9576801VXC	Rad Hard 4-Bit Magnitude Comparator	3059
C	HCTS86DMSR	5962R9581401VCC	Rad Hard Quad 2-Input Exclusive OR Gate	2249
C	HCTS86KMSR	5962R9581401VXC	Rad Hard Quad 2-Input Exclusive OR Gate	2249
C	HCTS93DMSR	5962R9573701VCC	Rad Hard 4-Bit Binary Ripple Counter	3060
C	HCTS93KMSR	5962R9573701VXC	Rad Hard 4-Bit Binary Ripple Counter	3060
C	HD1-15530-8	7802901JA	Manchester Encoder/Decoder, 24 Pin	2960
C	HD1-15531-8	5962-9054901MQA	Manchester Encoder/Decoder, 40 Lead CERDIP	2961
C	HD1-15531/883	5962-9054901MQA	Manchester Encoder/Decoder, 40 Lead CERDIP	2962
C	HD1-15531B-8	5962-9054902MQA	Manchester Encoder/Decoder 2m Bit, 40 Lead CERDIP	2961
C	HD1-15531B/883	5962-9054902MQA	Manchester Encoder/Decoder, 40 Lead CERDIP	2962
C	HD1-4702/883	5962-90518801MEA	Bit Rate Generator - 16 Lead CERDIP	2955
C	HD1-6402B/883	5962-9052502MQA	UART- 40 Lead CERDIP 8MHz	2953
C	HD1-6402R/883	5962-9052501MQA	UART- 40 Lead CERDIP 2MHz	2953
C	HD1-6409/883	5962-9088801MRA	Manchester Encoder/Decoder - 2MHz, 20 Lead CERDIP	2959
C	HD4-15530-8	78029013A	Manchester Encoder/Decoder, 28 Lead LCC	2960
C	HD4-6409/883	5962-9088801M2A	Manchester Encoder/Decoder - 2MHz, 20 Lead LCC	2959
C	HFA1100MJ/883	5962-9467601MPA	Op Amp - 850MHz, 8 Lead CERDIP	3615
C	HFA1102MJ/883		Op Amp - 850MHz, w/ Comp. Pin, 8 Lead CERDIP	-
C	HFA1110MJ/883	5962-9468301MPA	Unity Gain Buffer, 850MHz, 8 Lead CERDIP	3620
C	HFA1112MJ/883		Ultra High Speed Current Feedback Buffer	3610
C	HFA1113MJ/883	5962-9468201MPA	Clamped Output Buffer, 850MHz, Programmable Gain	3618
C	HFA1113ML/883	5962-9468201M2A	Clamped Output Buffer, 850MHz, 20 Lead CLCC	3618
C	HFA1115MJ/883		Programmable Gain Buffer With Clamps, 8 Lead CERDIP	3724
C	HFA1120MJ/883	5962-9468501MPA	Ultra High Speed Current Feedback Op Amp	3617
C	HFA1130MJ/883	5962-9467701MPA	Clamped Output Op Amp, 850MHz, 8 Lead CERDIP	3625
C	HFA1130ML/883	5962-9467701M2A	Clamped Op Amp, 850MHz, 20 Lead LCC	3625
C	HFA1135MJ/883		Low Power Op Amp, with Clamp, 8 Lead CERDIP	3725
C	HFA1135ML/883		Low Power Op Amp, with Clamp, 20 Lead CLCC	3725
C	HFA1145MJ/883		Low Power, High Speed Op Amp, with Disable	3726
C	HFA1212MJ/883		Dual Programmable Gain Buffer, 8 Lead CERDIP	3742
C	HFA1245MJ/883		Dual Low Power, High Speed Op Amp, with Disable	3743
C	HFA1412MJ/883		Quad Programmable Gain Buffer, 14 Lead CERDIP	3744
C	HFA3127MJ/883	5962-9474901MEA	High Speed NPN Transistor Array	3967
C	HI1-0200/883		Switch, 14 Lead CERDIP,15V Dual SPST CMOS	-
C	HI1-0201-8	7705302EA	Switch, 16 Lead CERDIP,15V Quad SPST CMOS	3121
C	HI1-0201/883	7705302EA	Switch, 16 Lead CERDIP,15V Quad SPST CMOS	-
C	HI1-0201HS-8	5962-8671601EA	Switch, 16 Lead CERDIP,15V Quad SPST High Speed	3123
C	HI1-0201HS/883	5962-8671601EA	Switch, 16 Lead CERDIP,15V Quad SPST High Speed	-
C	HI1-0222/883	5962-9456201MCA	Switch, 14 Lead CERDIP,15V 200MHz Dual SPST	-
C	HI1-0301/883		Switch, 14 Lead CERDIP,15V SPDT CMOS Analog	-
C	HI1-0302/883		Switch, 14 Lead CERDIP,15V Dual DPST CMOS Analog	-
C	HI1-0306/883		Switch, 14 Lead CERDIP,15V Dual DPST CMOS Analog	-
C	HI1-0307/883		Switch, 14 Lead CERDIP,15V Dual SPDT CMOS Analog	-
C	HI1-0384/883		Switch, 16 Lead CERDIP,15V Dual DPST CMOS Analog	-
C	HI1-0390/883		Switch, 16 Lead CERDIP,15V Dual SPDT CMOS Analog	-
C	HI1-0506	JM38510/19001BXA	See Ref P/N	3142
N	HI1-0506-8	5962-8513107XA	MUX, 28 Lead CERDIP,15V 16-Channel CMOS Analog	3142
C	HI1-0506/883	5962-8513107XA	MUX, 28 Lead CERDIP,15V 16-Channel CMOS Analog	-
N	HI1-0506A-8	HI1-0546/883	MUX, 28 Lead CERDIP,15V 16-Channel Over-Voltage Protected Analog	3143

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HI1-0507	JM38510/19003BXA	See Ref P/N	3142
N	HI1-0507-8	5962-8513108XA	MUX, 28 Lead CERDIP,15V Differential 8-Channel CMOS	3142
C	HI1-0507/883	5962-8513108XA	MUX, 28 Lead CERDIP,15V Differential 8-Channel CMOS	-
N	HI1-0507A-8	HI1-0547/883	MUX, 28 Lead CERDIP,15V Differential Over-Voltage Protected Analog	3143
C	HI1-0508	JM38510/19007BEA	See Ref P/N	3142
N	HI1-0508-8	7705201EC	MUX, 16 Lead CERDIP,15V 8-Channel CMOS Analog	3142
C	HI1-0508/883	7705201EC	MUX, 16 Lead CERDIP,15V 8-Channel CMOS Analog	-
N	HI1-0508A-8	HI1-0548/883	MUX, 16 Lead CERDIP,15V 8-Channel Over-Voltage Protected Analog	3143
C	HI1-0509	JM38510/19008BEA	See Ref P/N	3142
N	HI1-0509-8	5962-8513109EA	MUX, 16 Lead CERDIP,15V Differential 4-Channel CMOS	3142
C	HI1-0509/883	5962-8513109EA	MUX, 16 Lead CERDIP,15V Differential 4-Channel CMOS	-
N	HI1-0509A-8	HI1-0549/883	MUX, 16 Lead CERDIP,15V Differential 4-Channel, Over-Voltage Protected	3143
N	HI1-0516-8	5962-8869901XA	MUX, 28 Lead CDIP,15V 16-Channel/Differential 8-Channel	3146
C	HI1-0516/883	5962-8869901XA	MUX, 28 Lead CDIP,15V 16-Channel/Differential 8-Channel	-
N	HI1-0518-8		MUX, 18 Lead CDIP,15V 8-Channel/Differential 4-Channel	3147
N	HI1-0524-8	5962-8761801VA	MUX, 16 Lead CERDIP,15V 4-Channel Wideband/Video	3148
C	HI1-0524/883	5962-8761801VA	MUX, 16 Lead CERDIP,15V 4-Channel Wideband/Video	-
N	HI1-0539-8		MUX, 16 Lead CDIP,15V 4-Channel Low Level, Differential	3149
C	HI1-0546	JM38510/19002BXA	See Ref P/N	3150
C	HI1-0546/883	5962-8513101XA	MUX, 28 Lead CDIP,15V 16-Channel Over-Voltage Protected	-
C	HI1-0547	JM38510/19004BXA	See Ref P/N	3150
C	HI1-0547/883	5962-8513102XA	MUX, 28 Lead CERDIP,15V Differential 8-Channel Over-Voltage Protected	-
C	HI1-0548	JM38510/19005BEA	See Ref P/N	3150
C	HI1-0548/883	7705202EA	MUX, 16 Lead CDIP,15V 8-Channel Over-Voltage Protected	-
C	HI1-0549	JM38510/19006BEA	See Ref P/N	3150
C	HI1-0549/883	5962-8513103XA	MUX, 16 Lead CERDIP,15V Differential 4-Channel Over Voltage Protected	-
C	HI1-1818A/883		MUX, 16 Lead CERDIP, 15V 8-Channel CMOS Analog	3141
C	HI1-1828A/883		MUX, 16 Lead CERDIP, 15V Differential 4-Channel CMOS	3141
C	HI1-5040/883	8100609EA/MLB	Switch, 16 Lead CERDIP, 15V SPST CMOS Analog	-
N	HI1-5041-8	8100610EA/MLB	Switch, 16 Lead CERDIP, 15V Dual SPST CMOS Analog	3127
C	HI1-5041/883	8100610EA/MLB	Switch, 16 Lead CERDIP, 15V Dual SPST CMOS Analog	-
C	HI1-5042/883	8100611EA/MLB	Switch, 16 Lead CERDIP, 15V SPDT CMOS Analog	-
N	HI1-5043-8	8100612EA/MLB	Switch, 16 Lead CERDIP, 15V Dual SPDT CMOS Analog	3127
C	HI1-5043/883	8100612EA/MLB	Switch, 16 Lead CERDIP, 15V Dual SPDT CMOS Analog	-
C	HI1-5044/883	8100613EA/MLB	Switch, 16 Lead CERDIP, 15V DPST CMOS Analog	-
C	HI1-5045/883	8100614EA/MLB	Switch, 16 Lead CERDIP, 15V Dual DPST CMOS Analog	-
C	HI1-5046/883	8100615EA/MLB	Switch, 16 Lead CERDIP, 15V DPDT CMOS Analog	-
C	HI1-5046A/883	8100616EA/MLB	Switch, 16 Lead CERDIP, 15V DPDT CMOS Analog	-
C	HI1-5047/883	8100617EA/MLB	Switch, 16 Lead CERDIP, 15V 4PST CMOS Analog	-
C	HI1-5047A/883	8100618EA/MLB	Switch, 16 Lead CERDIP, 15V 4PST CMOS Analog	-
C	HI1-5048/883	8100619EA/MLB	Switch, 16 Lead CERDIP, 15V Dual SPST CMOS Analog	-
C	HI1-5049/883	8100620EA/MLB	Switch, 16 Lead CERDIP, 15V Dual DPST CMOS Analog	-
C	HI1-5050/883	8100621EA/MLB	Switch, 16 Lead CERDIP, 15V SPDT CMOS Analog	-
N	HI1-5051-8	8100622EA/MLB	Switch, 16 Lead CERDIP, 15V Dual SPDT CMOS Analog	3127
C	HI1-5051/883	8100622EA/MLB	Switch, 16 Lead CERDIP 15V Dual SPDT CMOS Analog	-
C	HI1-565ASD/883		D/A Converter, 12-Bit, 20 Lead CERDIP	-

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HI1-565ATD/883		D/A Converter, 12-Bit, 20 Lead CERDIP	-
C	HI1-5701T/883		Flash A/D, 18 Lead CERDIP, 6-Bit, 30 MSPS	3378
C	HI1-574ASD/883		A/D Converter, 28 Lead SBDIP, 12-Bit	-
C	HI1-574ATD/883	5962-8512704XA	A/D Converter, 28 Lead SBDIP, 12-Bit	-
C	HI1-574AUD/883	5962-8512703XA	A/D Converter, 28 Lead SBDIP, 12-Bit, 1/2 LSB	-
C	HI1-674ASD/883		A/D Converter, 28 Lead SBDIP, 12-Bit, 12ms	-
C	HI1-674ATD/883		A/D Converter, 28 Lead SBDIP, 12-Bit,12ms	-
C	HI1-674AUD/883		A/D Converter, 28 Lead SBDIP, 12-Bit,12ms	-
C	HI1-774T/883		A/D Converter, 28 Lead SBDIP, 12-Bit	-
C	HI2-0200/883		Switch, 10 Pin Can, 15V Dual SPST CMOS	-
C	HI2-0300/883		Switch, 10 Pin Can, 15V Dual SPST CMOS	-
C	HI2-0301/883		Switch, 10 Pin Can, 15V SPDT CMOS Analog	-
C	HI2-0304/883		Switch, 10 Pin Can, 15V Dual SPST CMOS	-
C	HI2-0305/883		Switch, 10 Pin Can, 15V SPST CMOS Analog	-
C	HI2-0381/883		Switch, 10 Pin Can, 15V Dual SPST CMOS	-
C	HI2-0387/883		Switch, 10 Pin Can, 15V SPDT CMOS Analog	-
C	HI4-0201/883	77053022A	Switch, 20 Lead LCC, 15V Quad SPST CMOS	-
C	HI4-0201HS/883	5962-86716012A	Switch, 20 Lead LCC, 15V Quad SPST High Speed	-
C	HI4-0222	5962-9456201M2A	See Ref P/N	3124
C	HI4-0506/883	5962-85131073A	MUX, 28 Lead LCC, 15V 16-Channel CMOS	-
N	HI4-0506A-8	HI4-0546/883	MUX, 28 Lead LCC, 15V 16-Channel Over-Voltage Protected	3143
C	HI4-0507/883	5962-85131083A	MUX, 28 Lead LCC, 15V Differential 8-Channel CMOS	-
N	HI4-0507A-8	HI4-0547/883	MUX, 28 Lead LCC, 15V Differential 8-Channel Over-Voltage Protected	3143
C	HI4-0508/883	77052012A	MUX, 20 Lead LCC, 15V 8-Channel CMOS	-
N	HI4-0508A-8	HI4-0548/883	MUX, 20 Lead LCC, 15V 8-Channel Over-Voltage Protected	3143
C	HI4-0509/883	5962-85131092A	MUX, 20 Lead LCC, 15V Differential 4-Channel CMOS	-
N	HI4-0509A-8	HI4-0549/883	MUX, 20 Lead LCC, 15V Differential 4-Channel Over-Voltage Protected	3143
N	HI4-0516-8	5962-88699013A	MUX, 28 Lead LCC, 15V 16-Channel/Differential 8-Channel	3146
N	HI4-0518-8		MUX, 20 Lead LCC, 15V 8-Channel/Differential 4-Channel	3147
N	HI4-0524-8		MUX, 20 Lead LCC, 15V 4-Channel Wideband/Video	3148
C	HI4-0546/883	5962-85131013A	MUX, 28 Lead LCC, 15V 16-Channel Over-Voltage Protected	-
C	HI4-0547/883	5962-85131023A	MUX, 28 Lead LCC, 15V Differential 8-Channel Over-Voltage Protected	-
C	HI4-0548/883	77052022A	MUX, 20 Lead LCC 15V 8-Channel Over-Voltage Protected	-
C	HI4-0549/883	5962-85131032A	MUX, 20 Lead LCC 15V Differential 4-Channel Over-Voltage Protected	-
N	HI4-1828A-8		MUX, 20 Lead LCC 15V Differential 4-Channel	3141
C	HI4-5043/883	81006122A	Switch, 20 Lead LCC, 15V Dual SPDT CMOS	-
C	HI4-5045/883	81006142A	Switch, 20 Lead LCC, 15V Dual SPDT CMOS	-
C	HI4-5051/883	81006222A	Switch, 20 Lead LCC, 15V Dual SPDT CMOS	-
C	HI4-574ASE/883		A/D Converter, 44 Lead LCC, 12-Bit 25ms	-
C	HI4-574ATE/883	5962-8512704YA	A/D Converter, 44 Lead LCC, 12-Bit 25ms	-
C	HI4-574AUE/883	5962-8512703YA	A/D Converter, 44 Lead LCC, 12-Bit 25ms	-
C	HI4-674ASE/883		A/D Converter, 44 Lead LCC, 12-Bit 12ms	-
C	HI4-674ATE/883		A/D Converter, 44 Lead LCC, 12-Bit 12ms	-
C	HI4-674AUE/883		A/D Converter, 44 Lead LCC, 12-Bit 12ms	-
C	HI4-774S/883		A/D Converter, 44 Lead LCC, 12-Bit 8ms	-
C	HI4-774T/883		A/D Converter, 44 Lead LCC, 12-Bit 8ms	-

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HI4-774U/883		A/D Converter, 44 Lead LCC, 12-Bit 8ms	-
C	HI5800SMF/883		A/D Converter, 12-Bit, 3 MSPS, 2 LSB, 44 Lead CQFP	2938
C	HI5800TMF/883		A/D Converter, 2-Bit, 3 MSPS, 1 LSB, 33 Lead CQFP	2938
C	HM1-6504	24501BVA	(JM38510/) See Ref P/N	2994
C	HM1-6504/883	8102405VA	4096 x 1 CMOS RAM, 300ns, 18 Lead CERDIP	2993
C	HM1-6504B/883	8102403VA	4096 x 1 CMOS RAM, 200ns, 18 Lead CERDIP	2993
C	HM1-6508/883		1024 x 1 CMOS RAM, 250ns, 16 Lead CERDIP	2985
C	HM1-6508B/883		1024 x 4 CMOS RAM, 180ns, 16 Lead CERDIP	2985
C	HM1-6514	24502BVA	(JM38510/) See Ref P/N	2995
C	HM1-6514/883	8102406VA	1024 x 4 CMOS RAM, 300ns,18 Lead CERDIP	2996
C	HM1-6514B/883	8102404VA	1024 x 1 CMOS RAM, 200ns 18 Lead CERDIP	2996
C	HM1-6514S/883	8102402VA	1024 x 4 CMOS RAM, 120ns Access Time	2996
C	HM1-6516	29102BJA	(JM38510/) See Ref P/N	2998
C	HM1-6516/883	8403601JA	2048 x 8 CMOS RAM, 200ns Access Time	2999
C	HM1-65162	29104BJA	(JM38510/) See Ref P/N	3000
C	HM1-65162/883	8403602JA	2048 x 8 CMOS RAM, 90ns Access Time	3001
C	HM1-65162B	29110BJA	(JM38510/) See Ref P/N	3000
C	HM1-65162B/883	8403606JA	2048 x 8 CMOS RAM, 70ns Access Time	3001
C	HM1-65162C/883	8403603ZA	2048 x 8 CMOS RAM, 90ns Access Time	3001
C	HM1-6516B/883	8403607JA	2048 x 8 CMOS RAM, 120ns Access Time	2999
C	HM1-6518/883		1024 x 4 CMOS RAM, 250ns, 18 Lead CERDIP	2986
C	HM1-65262	29103BRA	(JM38510/) See Ref P/N	3002
C	HM1-65262/883	8413201RA	6K x 1 CMOS RAM, 85ns Access Time	3003
C	HM1-6551/883		256 x 4 CMOS RAM, 300ns, 22 Lead CERDIP	2988
C	HM1-6551B/883		256 x 4 CMOS RAM, 220n, 22 Lead CERDIP	2988
C	HM1-6561/883		256 x 4 CMOS RAM, 300ns, 18 Lead CERDIP	2990
C	HM1-6561B/883		256 x 4 CMOS RAM, 220ns, 18 Lead CERDIP	2990
C	HM1-65642/883		8192 x 8 CMOS RAM, 150ns, Access Time	3004
C	HM1-65642B	29205BXA	(JM38510/) See Ref P/N	3005
C	HM1-65642B/883		8192 x 8 CMOS RAM, 150ns Access Time	3004
C	HM1-65642C/883		8192 x 8 CMOS RAM, 200ns Access Time	3004
C	HM1-6617/883	5962-8954001JA	2K x 8 CMOS PROM, 120ns Access Time	3016
C	HM1-6617B/883	5962-8954002JA	2K x 8 CMOS PROM, 90ns Access Time	3016
C	HM1-6642/883	5962-8869001JA	512 x 8 CMOS PROM, 200ns Access Time	3013
C	HM1-6642B/883	5962-8869002JA	512 x 8 CMOS PROM, 120ns Access Time	3013
N	HM4-6504-8		4096 x 1 CMOS RAM, 300ns Access Time	2994
N	HM4-6504B-8		4096 x 1 CMOS RAM, 200ns Access Time	2994
N	HM4-6514-8		1024 x 4 CMOS RAM, 300ns Access Time	2995
C	HM4-65162	8403603ZA	Ref Only, See Ref SMD P/N.	3000
C	HM4-65162/883	8403602ZA	2048 x 8 CMOS RAM 90ns Access Time	3001
C	HM4-65162B/883	8403606ZA	2048 x 8 CMOS RAM, 70ns Access Time	3001
C	HM4-6516B/883	8403607ZA	2048 x 8 CMOS RAM, 120ns Access Time	2999
C	HM4-65262/883	8413201YA	16K x 1 CMOS RAM, 85ns Access Time	3003
C	HM4-65262B/883	8413203YA	16K x 1 CMOS RAM, 70ns Access Time	3003
C	HM4-65642/883		8192 x 8 CMOS RAM, 150ns Access Time	3004
C	HM4-65642B/883		8192 x 8 CMOS RAM, 150ns Access Time	3004
C	HM4-6617/883	5962-8954001XA	2K x 8 CMOS PROM, 120ns Access Time	3016
C	HM4-6617B/883	5962-8954002XA	2K x 8 CMOS PROM, 90ns Access Time	3016
C	HM4-6642/883	5962-88690013A	512 x 8 CMOS PROM, 200ns Access Time	3013
C	HM6-6617/883	5962-8954001LA	2K x 8 CMOS PROM, 120ns Access Time	3016

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HM6-6617B/883	5962-8954002LA	2K x 8 CMOS PROM, 90ns Access Time	3016
C	HM6-6642/883	5962-8869001LA	512 x 8 CMOS PROM, 200ns Access Time	3013
C	HM6-6642B/883	5962-8869002LA	512 x 8 CMOS PROM, 120ns Access Time	3013
C	HM9-6516/883		2048 x 8 CMOS RAM, 200ns Access Time	2999
C	HM9-6516B/883		2048 x 8 CMOS RAM, 120ns Access Time	2999
C	HMA510GM-55/883		16 x 16 Digital Multiplier-Accumulator	2807
C	HMA510GM-65/883		16 x 16 Digital Multiplier-Accumulator	2807
C	HMA510GM-75/883		16 x 16 Digital Multiplier-Accumulator	2807
C	HMU16GM-45/883		16 x 16 Digital Multiplier, 68 Lead PGA, 45ns	2804
C	HMU16GM-60/883		16 x 16 Digital Multiplier, 68 Lead PGA, 60ns	2804
C	HMU17GM-45/883		16 x 16 Digital Multiplier, 68 Lead PGA, 45ns	2805
C	HMU17GM-60/883		16 x 16 Digital Multiplier, 68 Lead PGA, 60ns	2805
C	HS1-0506RH-Q	5962D9569101VXC	Rad Hard 16-Channel Analog MUX	4028
C	HS1-0507RH-Q	5962D9569102VXC	Rad Hard Differential 8-Channel Analog MUX	4028
C	HS1-0508RH-Q	5962D9569201VEA	Rad Hard Single 8-Channel MUX	3977
C	HS1-0509RH-Q	5962D9569202VEA	Rad Hard Differential 4-Channel Analog MUX	3977
C	HS1-0546RH-Q	5962D9569301VXA	Rad Hard 16-Channel Analog MUX	3544
C	HS1-0547RH-Q	5962D9569302VXA	Rad Hard Differential 8-Channel Analog MUX	3544
C	HS1-0548RH-Q	5962D9569401VEA	Rad Hard 8-Channel Analog MUX	3543
C	HS1-0549RH-Q	5962D9569402VEA	Rad Hard 8-Channel Analog MUX	3543
C	HS1-1245RH-Q	5962F9683201VCA	Rad Hard Dual Hi-Speed, Low Power Current Feedback Amp	4229
C	HS1-1840ARH-8	5962F9563002QYC	Rad Hard 16-Channel CMOS Analog MUX, w/ Overvoltage Prot.	-
C	HS1-1840ARH-Q	5962F9563002VXC	Rad Hard 16-Channel CMOS Analog MUX, w/ Overvoltage Prot.	-
C	HS1-2400RH-Q	5962D9568401VEA	Rad Hard Four-Channel Programmable Op Amp	4027
C	HS1-2420RH-Q	5962R9566901VCA	Rad Hard Fast Sample/Hold Amplifier	3554
C	HS1-245RH-8	5962R9672201QCC	Rad Hard Triple Line Transmitter	3034
C	HS1-245RH-Q	5962R9672201VCC	Rad Hard Triple Line Transmitter	3034
C	HS1-246RH-8	5962R9672301QCC	Rad Hard Triple Line Receiver	3034
C	HS1-246RH-Q	5962R9672301VCC	Rad Hard Triple Line Receiver	3034
C	HS1-248RH-8	5962R9672302QCC	Rad Hard Triple Party Line Receiver	3034
C	HS1-248RH-Q	5962R9672302VCC	Rad Hard Triple Party Line Receiver	3034
C	HS1-26C31RH-8	5962F9666301QEC	Rad Hard RS422 CMOS Line Transmitter	3401
C	HS1-26C31RH-Q	5962F9666301VEC	Rad Hard RS422 CMOS Line Transmitter	3401
C	HS1-26C32RH-8	5962F9668901QEC	Rad Hard RS422 CMOS Line Receiver	3402
C	HS1-26C32RH-Q	5962F9668901VEC	Rad Hard RS422 CMOS Line Receiver	3402
C	HS1-26CT31RH-8	5962F9563201QEC	Rad Hard RS422 TTL Line Transmitter	2929
C	HS1-26CT31RH-Q	5962F9563201VEC	Rad Hard RS422 TTL Line Transmitter	2929
C	HS1-26CT32RH-8	5962F9563101QEC	Rad Hard RS422 TTL Line Receiver	2930
C	HS1-26CT32RH-Q	5962F9563101VEC	Rad Hard RS422 TTL Line Receiver	2930
C	HS1-2700RH-Q	5962R9567002VCA	Rad Hard Low Power, High Performance Op Amp	3624
C	HS1-302RH-8	5962R9581201QCC	Rad Hard Dual CMOS Analog Switch	3067
C	HS1-302RH-Q	5962R9581201VCC	Rad Hard Dual CMOS Analog Switch	3067
C	HS1-303RH-8	5962R9581301QCC	Rad Hard CMOS Analog Switch	3067
C	HS1-303RH-Q	5962R9581301VCC	Rad Hard CMOS Analog Switch	3067
C	HS1-307RH-8	5962R9581302QCC	Rad Hard Dual SPDT CMOS Analog Switch	3067
C	HS1-307RH-Q	5962R9581302VCC	Rad Hard Dual SPDT CMOS Analog Switch	3067
N	HS1-3182-8		Non-Rad Hard, ARINC Bus Interface Line Driver	2963
C	HS1-3282-8	5962-8688001XA	Non-Rad Hard, ARINC Bus Interface Circuit	2964
C	HS1-3374RH-8	5962R9678601QWC	Rad Hard 8-Bit Bidirectional CMOS/TTL Level Converter	3038
C	HS1-3374RH-Q	5962R9678601VWC	Rad Hard 8-Bit Bidirectional CMOS/TTL Level Converter	3038

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HS1-390RH-8	5962R9581303QEC	Rad Hard Dual SPDT CMOS Analog Switch	3067
C	HS1-390RH-Q	5962R9581303VEC	Rad Hard Dual SPDT CMOS Analog Switch	3067
C	HS1-508ARH-8	5962R9674201QEC	Rad Hard 8-Channel CMOS Analog MUX, w/ Overvoltage Prot.	4097
C	HS1-508ARH-Q	5962R9674201VEC	Rad Hard 8-Channel CMOS Analog MUX, w/ Overvoltage Prot.	4097
C	HS1-5104ARH-Q	5962R9569001VCC	Rad Hard Quad Low Noise Op Amp	3025
C	HS1-54C138RH-8	5962R9582501QEC	Rad Hard 3-Line To 8-Line Decoder/DeMUX	3037
C	HS1-54C138RH-Q	5962R9582501VEC	Rad Hard 3-Line To 8-Line Decoder/DeMUX	3037
C	HS1-565ARH-Q	5962R9675501VJC	Rad Hard 12-Bit D/A Converter	3278
C	HS1-6254RH-Q	5962F9764101VEA	Rad Hard High Frequency NPN Transistor Array	4425
C	HS1-65647RH-8	5962F9582301QXC	Rad Hard 8K x 8 SOS SRAM	2928
C	HS1-65647RH-Q	5962F9582301VXC	Rad Hard 8K x 8 SOS SRAM	2928
C	HS1-6617RH-8	5962R9570801QJC	Rad Hard 2K x 8 CMOS PROM	3033
C	HS1-6617RH-Q	5962R9570801VJC	Rad Hard 2K x 8 CMOS PROM	3033
C	HS1-6664RH-8	5962F9562601QXC	Rad Hard 8K x 8 CMOS PROM	3197
C	HS1-6664RH-Q	5962F9562601VXC	Rad Hard 8K x 8 CMOS PROM	3197
C	HS1-80C85RH-8	5962R9582401QQC	Rad Hard 8-Bit CMOS Microprocessor	3036
C	HS1-80C85RH-Q	5962R9582401VQC	Rad Hard 8-Bit CMOS Microprocessor	3036
C	HS1-80C86RH-8	5962R9572201QQC	Rad Hard 16-Bit CMOS Microprocessor	3035
C	HS1-80C86RH-Q	5962R9572201VQC	Rad Hard 16-Bit CMOS Microprocessor	3035
C	HS1-81C55RH-8	5962R9676601QXC	Rad Hard 256 x 8 CMOS RAM	3039
C	HS1-81C55RH-Q	5962R9676601VXC	Rad Hard 256 x 8 CMOS RAM	3039
C	HS1-81C56RH-8	5962R9676602QXC	Rad Hard 256 x 8 CMOS RAM	3039
C	HS1-81C56RH-Q	5962R9676602VXC	Rad Hard 256 x 8 CMOS RAM	3039
C	HS1-82C08RH-8	5962R9571401QRC	Rad Hard 8-Bit Bus Transceiver	3040
C	HS1-82C08RH-Q	5962R9571401VRC	Rad Hard 8-Bit Bus Transceiver	3040
C	HS1-82C12RH-8	5962R9581801QJC	Rad Hard 8-Bit Input/Output Port	3041
C	HS1-82C12RH-Q	5962R9581801VJC	Rad Hard 8-Bit Input/Output Port	3041
C	HS1-82C37ARH-8	5962R9582101QQC	Rad Hard CMOS High Performance Prog. DMA Controller	3042
C	HS1-82C37ARH-Q	5962R9582101VQC	Rad Hard CMOS High Performance Prog. Controller	3042
C	HS1-82C54RH-8	5962R9571301QJC	Rad Hard CMOS Programmable Interval Timer	3043
C	HS1-82C54RH-Q	5962R9571301VJC	Rad Hard CMOS Programmable Interval Timer	3043
C	HS1-82C55ARH-8	5962R9581901QQC	Rad Hard CMOS Programmable Peripheral Interface	3191
C	HS1-82C55ARH-Q	5962R9581901VQC	Rad Hard CMOS Programmable Peripheral Interface	3191
C	HS1-82C85RH-8	5962R9582001QJC	Rad Hard CMOS Static Clock Controller/Generator	3044
C	HS1-82C85RH-Q	5962R9582001VJC	Rad Hard CMOS Static Clock Controller/Generator	3044
C	HS1-9008RH-8	5962R9669601QXC	Rad Hard 8-Bit Flash A/D Converter	3279
C	HS1-9008RH-Q	5962R9669601VXC	Rad Hard 8-Bit Flash A/D Converter	3279
C	HS2-2520RH-Q	5962D9568501VGA	Rad Hard Uncompensated, High Slew Rate Op Amp	3599
C	HS2-2620RH-Q	5962D9568801VGA	Rad Hard Wideband, High Impedance Op Amp	4014
C	HS2-2622RH-Q	5962D9568802VGA	Rad Hard Wideband, High Impedance Op Amp	4014
C	HS2-2700RH-Q	5962R9567002VGA	Rad Hard Low Power, High Performance Op Amp	3624
C	HS4-6617RH-8		Rad Hard 2K x 8 CMOS PROM	3033
C	HS7-1100RH-Q	5962F9467602VPA	Rad Hard Linear Current Feedback Amp, Ultra Hi-Speed	4100
C	HS7-1115RH-Q	5962F9678501VPA	Rad Hard Hi-Speed, Low Power CL Buffer, w/Output Limiting	4098
C	HS7-1120RH-Q	5962F9675601VPA	Rad Hard Ultra Hi-Speed Current Feedback Amp, w/Offset Adj.	4101
C	HS7-1135RH-Q	5962F9676701VPA	Rad Hard Hi-Speed, Low Power CF Amp, w/Output Limiting	4099
C	HS7-1145RH-Q	5962F9683001VPA	Rad Hard Low Power, CF Amp, w/Output Disable	4227
C	HS7-1212RH-Q	5962F9683101VPA	Rad Hard Dual Hi-Speed, Low Power Closed-Loop Buffer	4228
C	HS7-1412RH-Q	5962F9683401VCA	Rad Hard Quad Hi-Speed, Low Power Closed Loop Buffer	4230
C	HS7-2510RH-Q	5962D9568601VPA	Rad Hard Internally Compensated, High Slew Rate Op Amp	3592

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HS7-2520RH-Q	5962D9568501VPA	Rad Hard Uncompensated, High Slew Rate Op Amp	3599
C	HS7-2600RH-Q	5962D9567101VPA	Rad Hard Wideband, High Impedance Op Amp	3650
C	HS7-2620RH-Q	5962D9568801VPA	Rad Hard Wideband, High Impedance Op Amp	4014
C	HS7-2622RH-Q	5962D9568802VPA	Rad Hard Wideband, High Impedance Op Amp	4014
C	HS8-RTX2010RH-8	5962F9563501QXC	Rad Hard 16-Bit Microcontroller	3961
C	HS8-RTX2010RH-Q	5962F9563501VXC	Rad Hard 16-Bit Microcontroller	3961
C	HS9-1840ARH-8	5962F9563002QYC	Rad Hard 16-Channel CMOS Analog MUX, w/Overvoltage Prot.	4355
C	HS9-1410RH-Q	5962F9851801VXC	Rad Hard High Speed, Low Power, Current Feedback Amplified with Output Disable	-
C	HS9-1840ARH-Q	5962F9563002VYC	Rad Hard 16-Channel CMOS Analog MUX, w/Overvoltage Prot.	4355
C	HS9-22620RH-Q	5962F9751201VXC	Red Hard Dual, Wideband High Impedan Uncompensated Op Amp	4349
C	HS9-245RH-8	5962R9672201QXC	Rad Hard Triple Line Transmitter	3034
C	HS9-245RH-Q	5962R9672201VXC	Rad Hard Triple Line Transmitter	3034
C	HS9-246RH-8	5962R9672301QXC	Rad Hard Triple Line Receiver	3034
C	HS9-246RH-Q	5962R9672301VXC	Rad Hard Triple Line Receiver	3034
C	HS9-248RH-8	5962R9672302QXC	Rad Hard Triple Party Line Receiver	3034
C	HS9-248RH-Q	5962R9672302VXC	Rad Hard Triple Party Line Receiver	3034
C	HS9-26C31RH-8	5962F9666301QXC	Rad Hard RS422 CMOS Line Transmitter	3401
C	HS9-2510RH-Q	5962D9568601VXA	Rad Hard Internally Compensated, High Slew Rate Op Amp	3592
C	HS9-26C31RH-Q	5962F9666301VXC	Rad Hard RS422 CMOS Line Transmitter	3401
C	HS9-26C32RH-8	5962F9668901QXC	Rad Hard RS422 CMOS Line Receiver	3402
C	HS9-26C32RH-Q	5962F9668901VXC	Rad Hard RS422 CMOS Line Receiver	3402
C	HS9-26CT31RH-8	5962F9563201QXC	Rad Hard RS422 TTL Line Transmitter	2929
C	HS9-26CT31RH-Q	5962F9563201VXC	Rad Hard RS422 TTL Line Transmitter	2929
C	HS9-26CT32RH-8	5962F9563101QXC	Rad Hard RS422 TTL Line Receiver	2930
C	HS9-26CT32RH-Q	5962F9563101VXC	Rad Hard RS422 TTL Line Receiver	2930
C	HS9-302RH-8	5962R9581201QXC	Rad Hard Dual DPST CMOS Analog Switch	3067
C	HS9-302RH-Q	5962R9581201VXC	Rad Hard Dual DPST CMOS Analog Switch	3067
C	HS9-303RH-8	5962R9581301QXC	Rad Hard Dual SPDT CMOS Analog Switch	3067
C	HS9-303RH-Q	5962R9581301VXC	Rad Hard Dual SPDT CMOS Analog Switch	3067
C	HS9-307RH-8	5962R9581302QXC	Rad Hard Dual SPDT CMOS Analog Switch	3067
C	HS9-307RH-Q	5962R9581302VXC	Rad Hard Dual SPDT CMOS Analog Switch	3067
C	HS9-390RH-8	5962R9581303QYC	Rad Hard Dual SPDT CMOS Analog Switch	3067
C	HS9-390RH-Q	5962R9581303VYC	Rad Hard Dual SPDT CMOS Analog Switch	3067
C	HS9-508ARH-8	5962R9674201QXC	Rad Hard 8-Channel CMOS Analog MUX, w/Overvoltage Prot.	4097
C	HS9-508ARH-Q	5962R9674201VXC	Rad Hard 8-Channel CMOS Analog MUX, w/Overvoltage Prot.	4097
C	HS9-54C138RH-8	5962R9582501QXC	Rad Hard 3-Line To 8-Line Decoder/DeMUX	3037
C	HS9-54C138RH-Q	5962R9582501VXC	Rad Hard 3-Line To 8-Line Decoder/DeMUX	3037
C	HS9-565ARH-Q	5962R9675501VXC	Rad Hard 12-Bit D/A Converter	3278
C	HS9-6254RH-Q	5962F9764101VXC	Rad Hard Ultra High Frequency NPN Transistor Array	4425
C	HS9-65647RH-8	5962F9582301QYC	Rad Hard 8K x 8 SOS SRAM	2928
C	HS9-65647RH-Q	5962F9582301VYC	Rad Hard 8K x 8 SOS SRAM	2928
C	HS9-6617RH-8	5962R9570801QXC	Rad Hard 2K x 8 CMOS PROM	3033
C	HS9-6617RH-Q	5962R9570801VXC	Rad Hard 2K x 8 CMOS PROM	3033
C	HS9-6664RH-8	5962F9562601QYC	Rad Hard 8K x 8 CMOS PROM	3197
C	HS9-6664RH-Q	5962F9562601VYC	Rad Hard 8K x 8 CMOS PROM	3197
C	HS9-80C85RH-8	5962R9582401QXC	Rad Hard 8-Bit CMOS Microprocessor	3036
C	HS9-80C85RH-Q	5962R9582401VXC	Rad Hard 8-Bit CMOS Microprocessor	3036
C	HS9-80C86RH-8	5962R9572201QXC	Rad Hard 16-Bit CMOS Microprocessor	3035

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	HS9-80C86RH-Q	5962R9572201VXC	Rad Hard 16-Bit CMOS Microprocessor	3035
C	HS9-81C55RH-8	5962R9676601QYC	Rad Hard 256 x 8 CMOS RAM	3039
C	HS9-81C55RH-Q	5962R9676601VYC	Rad Hard 256 x 8 CMOS RAM	3039
C	HS9-81C56RH-8	5962R9676602QYC	Rad Hard 256 x 8 CMOS RAM	3039
C	HS9-81C56RH-Q	5962R9676602VYC	Rad Hard 256 x 8 CMOS RAM	3039
C	HS9-82C08RH-8	5962R9571401QXC	Rad Hard 8-Bit Bus Transceiver	3040
C	HS9-82C08RH-Q	5962R9571401VXC	Rad Hard 8-Bit Bus Transceiver	3040
C	HS9-82C12RH-8	5962R9581801QXC	Rad Hard 8-Bit Input/Output Port	3041
C	HS9-82C12RH-Q	5962R9581801VXC	Rad Hard 8-Bit Input/Output Port	3041
C	HS9-82C37ARH-8	5962R9582101QXC	Rad Hard CMOS High Performance Prog. DMA Controller	3042
C	HS9-82C37ARH-Q	5962R9582101VXC	Rad Hard CMOS High Performance Prog. DMA Controller	3042
C	HS9-82C54RH-8	5962R9571301QXC	Rad Hard CMOS Programmable Interval Timer	3043
C	HS9-82C54RH-Q	5962R9571301VXC	Rad Hard CMOS Programmable Interval Timer	3043
C	HS9-82C85RH-8	5962R9582001QXC	Rad Hard CMOS Static Clock Controller/Generator	3044
C	HS9-82C85RH-Q	5962R9582001VXC	Rad Hard CMOS Static Clock Controller/Generator	3044
C	HS9-9008RH-8	5962R9669601QYC	Rad Hard 8-Bit Flash A/D Converter	3279
C	HS9-9008RH-Q	5962R9669601VYC	Rad Hard 8-Bit Flash A/D Converter	3279
C	HS9-RTX2010RH-8	5962F9563501QYC	Rad Hard 16-Bit Microcontroller	3961
C	HS9-RTX2010RH-Q	5962F9563501VYC	Rad Hard 16-Bit Microcontroller	3961
C	HSP43168GM-25/883		Dual Digital Filter 85 Lead PGA, 25MHz	3177
C	HSP43168GM-33/883		Dual Digital Filter 85 Lead PGA, 33MHz	3177
C	HSP43220GM-15/883		Decimating Digital Filter 84 Lead PGA, 15MHz	2802
C	HSP43220GM-25/883		Decimating Digital Filter 84 Lead PGA, 25MHz	2802
N	HSP43220TM-15		Decimating Digital Filter 84 Lead Tab, 15MHz	2486
N	HSP43220TM-25		Decimating Digital Filter 84 Lead Tab, 25MHz	2486
C	HSP43481GM-20/883		4 Tap, FIR Filter (8-Bit) 20MHz, 68 Lead PGA	2450
C	HSP43481GM-25/883		4 Tap, FIR Filter (8-Bit) 25.6MHz, 68 Lead PGA	2450
C	HSP43881GM-20/883		8 Tap, FIR Filter (8-Bit) 20MHz, 85 Lead PGA	2449
C	HSP43881GM-25/883		8 Tap, FIR Filter (8-Bit) 25.6MHz, 85 Lead PGA	2449
C	HSP43891GM-20/883	5962-9209701MX	8 Tap, 9-Bit FIR Filter, 85 Lead PGA, Dual Brand	2451
C	HSP43891GM-25/883	5962-9209702MX	8 Tap, 9-Bit FIR Filter, 85 Lead PGA, Dual Brand	2451
C	HSP45106GM-25/883		16-Bit Numerically Controlled Oscillator, 85 Lead PGA	2815
C	HSP45106GM-30/883		16-Bit Numerically Controlled Oscillator, 85 Lead PGA	2815
C	HSP45116GM-15/883		16-Bit Numerically Controlled Oscillator/Modulator, 144 Lead PGA	2813
C	HSP45116GM-25/883		16-Bit Numerically Controlled Oscillator/Modulator, 144 Lead PGA	2813
N	HSP45116TM-15		Numerically Controlled Oscillator, 156 Lead TAB Tape	2485
N	HSP45116TM-25		Numerically Controlled Oscillator, 156 Lead TAB Tape	2485
C	HSP45240GM-25/883		Address Sequencer, 68 Lead PGA, 25.6MHz	2816
C	HSP45240GM-33/883		Address Sequencer, 68 Lead PGA, 33MHz	2816
C	HSP45240GM-40/883		Address Sequencer, 68 Lead PGA, 40MHz	2816
C	HSP45256GM-20/883		Binary Correlator, 20MHz, 85 Lead PGA	2997
C	HSP45256GM-25/883		Binary Correlator, 25.6MHz, 85 Lead PGA	2997
C	HSP48410GM-25/883	5962-9457301MX	Histogrammer, 33MHz, 25 Lead PGA, Dual Brand	3542
C	HSP48410GM-33/883	5962-9457302MX	Histogrammer, 33MHz, 84 Lead PGA, Dual Brand	3542
C	HSP48908GM-20/883	5962-9300701MX	2-Dimensional Convolver, 20MHz, 84 Lead PGA, Dual Brand	2783
C	HSP48908GM-27/883		3 x 3 2-Dimensional Convolver, 27MHz, 84 Lead PGA	2783
C	HV400MJ/883		High Current MOSFET Driver, 8 Lead SBDIP	3584
C	ICL232MJE/883B		Dual Transmitter Receiver, +5V, 16 Lead CERDIP	3020
C	ICL7109MDL/883B		A/D Microprocessor, 12-Bit, 40 Lead SBDIP	3092
N	ICL7650SMJD/HR		Precision Op Amp, 20mV	2920

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	ICL7650SMTV1HR		Precision Op Amp, 20mV, 8 Lead Can	2920
C	ICL7660MTV/883B		Voltage Converter, 8 Lead Can	3072
C	ICL7660SMTV/883B		Voltage Converter, 8 Lead Can	3179
C	ICL7662MTV/883B		CMOS 20V Voltage Converter, 8 Pin Can	3181
C	ICL7667MJA/883B	5962-8766001PA	Dual Power MOS Driver, 8 Lead CERDIP	2853
C	ICL7667MTV/883B	5962-8766001G	Dual Power MOS Driver, 8 Lead Can	2853
N	ICL8013BMTX/HR		Multiplier, 1.0%, 10 Lead Can	2863
N	ICL8013CMTX/HR		Multiplier, 2.0%, 10 Lead Can	2863
C	ICL8038AMJD/883B	5962-8877201CA	Waveform Generator, 250ppm (Max), 14 Lead CERDIP	2864
C	ICL8038BMJD/883B		Waveform Generator, 350ppm (Max), 14 Lead CERDIP	2864
N	ICL8038CCJD/BI		Waveform Generator, 350ppm (Typ), 14 Lead CERDIP	2864
C	ICL8069CMSQ/883B		Voltage Reference, 50ppm Band-Gap, 2 Lead Can (TO-52)	3172
C	ICL8069DMSQ/883B		Voltage Reference, 100ppm Band-Gap, 2 Lead Can (TO-52)	3172
C	ICL8211MTY/883B	5962-8984201G	Voltage Reference, Indicator, 8 Lead Can	3184
C	ICL8212MTY/883B	5962-8984202G	Voltage Reference, Indicator, 8 Lead Can	3184
C	ICM7170AMDG/883B	5962-8765301JA	Real Time Clock, µP, 20 Lead SBDIP	3019
C	ICM7170MDG/883B		Real Time Clock, µP, 20 Lead SBDIP	3019
C	ICM7228AMJI883B		Universal LED Driver Compatible A, 28 Lead CDIP, 8-Digit	3160
C	ICM7228BMJI883B		Universal LED Driver Compatible C, 28 Lead CDIP, 8-Digit	3160
C	ICM7228CMJI883B		Universal LED Driver Compatible A, 28 Lead CDIP, 8-Digit	3160
C	ICM7228DMJI883B		Universal LED Driver Compatible C, 28 Lead CDIP, 8-Digit	3160
C	ICM7555MTV/883B	5962-8950303G	CMOS 555 Timer, 8 Lead Can	2867
C	ICM7556MJD/883B	5962-8950304CA	CMOS 556 Dual Timer, 14 Lead CERDIP	2867
C	IH5012MDE/883B		Analog Switch, 16 Lead CERDIP, 5.0V Quad	3129
C	IH5040MDE	JM38510/10501BEA	See Ref P/N	-
C	IH5041MDE	JM38510/10502BEA	See Ref P/N	-
C	IH5042MDE	JM38510/10503BEA	See Ref P/N	-
C	IH5043MDE	JM38510/10504BEA	See Ref P/N	3130
C	IH5043MJE/883B	8100604EA	Analog Switch, 16 Lead CERDIP, 15V Dual SPDT CMOS	3130
C	IH5044MDE	JM38510/10505BEA	See Ref P/N	-
C	IH5045MDE	JM38510/10506BEA	See Ref P/N	-
C	IH5140MJE/883B	8100609EA/INT	Analog Switch, 16 Lead CERDIP, 15V SPST CMOS	3132
C	IH5141MJE/883B	8100610EA/INT	Analog Switch, 16 Lead CERDIP, 15V Dual SPST CMOS	3132
C	IH5142MJE/883B	8100611EA/INT	Analog Switch, 16 Lead CERDIP, 15V SPDT CMOS	3132
C	IH5143MJE/883B	8100612EA/INT	Analog Switch, 16 Lead CERDIP, 15V Dual SPDT CMOS	3132
C	IH5144MJE/883B	8100613EA/INT	Analog Switch, 16 Lead CERDIP, 15V DPST CMOS	3132
C	IH5145MJE/883B	8100614EA/INT	Analog Switch, 16 Lead CERDIP, 15V Dual DPST CMOS	3132
C	IH5151MJE/883B	8100622EA/INT	Analog Switch, 16 Lead CERDIP, 15V Dual SPDT CMOS	3133
C	IH5341MTW/883B		RF/Video Switch, 10 Pin Can, 15V Dual SPST	3134
C	IH5352MJE/883B	5962-8875001EA	RF/Video Switch, 16 Lead CERDIP, 15V Quad SPST CMOS	3134
C	IH6108MJE/883B		Analog MUX, 16 Lead CERDIP, 15V 8-Channel CMOS	3156
C	IH6201MJE/883B		Driver/Translator, 16 Lead CERDIP, 15V Dual CMOS	3136
C	IH6208MJE/883B		Analog MUX, 16 Lead CDIP, 15V Differential 4-Channel CMOS	3157
C	JM38510/05001BCA	CD4011AFB	Quad 2-Input NAND Gate	-
C	JM38510/05003BCA	CD4011BFB	Quad 2-Input NAND Gate	-
C	JM38510/05051BCA	CD4011BFB	Quad 2-Input NAND Gate	-
C	JM38510/05052BCA	CD4012BFB	Dual 4-Input NAND Gate	-
C	JM38510/05053BCA	CD4023BFB	Triple 3-Input NAND Gate	-
C	JM38510/05101BCA	CD4013AFB	Dual D-Type Flip-Flop with Set/Reset Capabilities	-
C	JM38510/05102BEA	CD4027AFB	Dual J-K Flip-Flop with Set/Reset Capabilities	-

PART NUMBER LISTING (Continued)

COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	JM38510/05151BCA	CD4013BFB	Dual D-Type Flip-Flop with Set/Reset Capabilities	-
C	JM38510/05152BEA	CD4027BFB	Dual J-K Flip-Flop with Set/Reset Capabilities	-
C	JM38510/05201BCA	CD4000AFB	Dual 3-Input NOR Gate Plus Inverter	-
C	JM38510/05202BCA	CD4001AFB	Quad 2-Input NOR Gate	-
C	JM38510/05204BCA	CD4025AFB	Triple 3-Input NOR Gate	-
C	JM38510/05252BCA	CD4001BFB	Quad 2-Input NOR Gate	-
C	JM38510/05254BCA	CD4025BFB	Triple 3-Input NOR Gate	-
C	JM38510/05301BCA	CD4007AFB	Dual Complementary Pair Plus Inverter	-
C	JM38510/05302BEA	CD4019AFB	Quad AND/OR Select Gate	-
C	JM38510/05352BEA	CD4019BFB	Quad AND/OR Select Gate	-
C	JM38510/05353BCA	CD4030BFB	Presettable Up/Down Counter	-
C	JM38510/05503BEA	CD4049AFB	Hex Buffer/Converter, Inverting	-
C	JM38510/05504BEA	CD4050AFB	Hex Buffer/Converter, Non-Inverting	-
C	JM38510/05553BEA	CD4049UBFB	Hex Buffer/Converter, Inverting	-
C	JM38510/05554BEA	CD4050BFB	Hex Buffer/Converter, Inverting	-
C	JM38510/05601BEA	CD4017AFB	Decade Counter/Divider	-
C	JM38510/05603BEA	CD4020AFB	14-Stage Binary Ripple Counter	-
C	JM38510/05605BCA	CD4024AFB	7-Stage Binary Ripple Counter	-
C	JM38510/05651BEA	CD4017BFB	Decade Counter/Divider	-
C	JM38510/05652BEA	CD4018BFB	Presettable Divide-by-N Counter	-
C	JM38510/05653BEA	CD4020BFB	14-Stage Binary Ripple Counter	-
C	JM38510/05655BCA	CD4024BFB	7-Stage Binary Ripple Counter	-
C	JM38510/05754BEA	CD4021BFB	8-Stage Static Shift Register	-
C	JM38510/05852BCA	CD4066BFB	Quad Bilateral Switch	-
C	JM38510/10501BEA	IH5040MDE	SPST CMOS Analog Switch	-
C	JM38510/10502BEA	IH5041MDE	Dual SPST CMOS Analog Switch	-
C	JM38510/10503BEA	IH5042MDE	SPDT CMOS Analog Switch	-
C	JM38510/10504BEA	IH5043MDE	Dual SPDT CMOS Analog Switch	-
C	JM38510/10505BEA	IH5044MDE	DPST CMOS Analog Switch	-
C	JM38510/10506BEA	IH5045MDE	Dual DPST CMOS Analog Switch	-
C	JM38510/11601BCA	DG300AAP	Dual SPST CMOS Analog Switch	-
C	JM38510/11602BCA	DG301AAP	SPDT CMOS Analog Switch	-
C	JM38510/11603BCA	DG302AAP	Dual DPST CMOS Analog Switch	-
C	JM38510/11604BCA	DG303AAP	Dual SPDT CMOS Analog Switch	-
C	JM38510/12202BGA	HA2-2600	High Slew Rate Op Amp	-
C	JM38510/12202BPA	HA7-2600	High Slew Rate Op Amp	-
C	JM38510/12203BGA	HA2-2620	High Slew Rate Op Amp	-
C	JM38510/12203BPA	HA7-2620	High Slew Rate Op Amp	-
C	JM38510/12204BGA	HA2-2500	High Slew Rate Op Amp	-
C	JM38510/12204BPA	HA7-2500	High Slew Rate Op Amp	-
C	JM38510/12205BGA	HA2-2510	High Slew Rate Op Amp	-
C	JM38510/12205BPA	HA7-2510	High Slew Rate Op Amp	-
C	JM38510/12206BGA	HA2-2520	High Slew Rate Op Amp	-
C	JM38510/12206BPA	HA7-2520	High Slew Rate Op Amp	-
C	JM38510/12302BEA	DG201AAP	Quad SPST CMOS Analog Switch	-
C	JM38510/17001BCA	CD4081BFB	Quad 2-Input AND Gate	-
C	JM38510/17002BCA	CD4082BFB	Dual 4-Input AND Gate	-
C	JM38510/17003BCA	CD4073BFB	Triple 3-Input AND Gate	-
C	JM38510/17101BCA	CD4071BFB	Quad 2-Input OR Gate	-
C	JM38510/17103BCA	CD4075BFB	Triple 3-Input OR Gate	-

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	JM38510/17203BCA	CD4070BFB	Quad Exclusive-OR Gate	-
C	JM38510/17401BCA	CD4069UBFB	Hex Inverter	-
C	JM38510/17403BEA	CD4502BFB	Strobed Hex Inverter/Buffer	-
C	JM38510/17504BEA	CD4098BFB	Dual Monostable Multivibrator	-
C	JM38510/17601BEA	CD4099BFB	8-Bit Addressable Latch	-
C	JM38510/19001BXA	HI1-0506	16-Channel CMOS Analog MUX	-
C	JM38510/19002BXA	HI1-0546	16-Channel Over-Voltage Protected CMOS Analog MUX	-
C	JM38510/19003BXA	HI1-0507	8-Channel Differential CMOS Analog MUX	-
C	JM38510/19004BXA	HI1-0547	8-Channel Differential Over-Voltage Protected CMOS MUX	-
C	JM38510/19005BEA	HI1-0548	8-Channel Over-Voltage Protected CMOS MUX	-
C	JM38510/19006BEA	HI1-0549	4-Channel Differential Over-Voltage Protected CMOS MUX	-
C	JM38510/19007BEA	HI1-0508	8-Channel CMOS Analog MUX	-
C	JM38510/19008BEA	HI1-0509	4-Channel Differential CMOS Analog MUX	-
C	M83530/1-2000B		MIL MOV 200V	-
C	M83530/1-2200D		MIL MOV 220V	-
C	M83530/1-4300E		MIL MOV 430V	-
C	M83530/1-5100E		MIL MOV 510V	-
C	MD80C86-2	8405202QA	CMOS 16-Bit CPU - 8MHz, 40 Lead CERDIP	2957
N	MD80C86-2/B		CMOS 16-Bit CPU - 8MHz, 40 Lead CERDIP	2957
C	MD80C86/7	5962-9672801VQC	CMOS 16-Bit CPU - 5MHz, 40 Lead CDIP, w/ Class Q Screen	2957
C	MD80C86	8405201XA	CMOS 16-Bit CPU - 5MHz, 40 Lead CERDIP	2957
N	MD80C86/B		CMOS 16-Bit CPU - 5MHz, 40 Lead CERDIP	2957
C	MD80C88-2		CMOS 8/16-Bit CPU - 8MHz, 40 Pin CERDIP	2949
N	MD80C88-2/B		CMOS 8/16-Bit CPU - 8MHz, 40 Lead CERDIP	2949
C	MD80C88	5962-8601601QA	CMOS 8/16-Bit CPU - 5MHz. 40 Lead CERDIP	2949
N	MD80C88/B		CMOS 8/16-Bit CPU - 5MHz, 40 Lead CERDIP	2949
C	MD82C237-12/B	5962-9053404MQA	CMOS DMA Controller - 12MHz, 5.0V, 40 CERDIP	2965
N	MD82C237/B		CMOS DMA Controller - 8MHz, 5.0V, 40 CERDIP	2965
C	MD82C284-10/883		CMOS Clock Generator/Driver - 10MHz, 5.0V, 18 Lead CDIP	2968
C	MD82C284-12/883		CMOS Clock Generator/Driver - 12MHz, 5.0V, 18 Lead CDIP	2968
C	MD82C37A-12/B	5962-9054303MQA	CMOS DMA Controller - 12MHz, 5.0V, 40 Lead CERDIP	2967
N	MD82C37A-5/B		CMOS DMA Controller - 5MHz, 40 Lead CERDIP	2967
C	MD82C37A/B	5962-9054302MQA	CMOS DMA Controller - 8MHz, 40 Lead CERDIP	2967
N	MD82C50A-5/B		CMOS Asynchronous Comm Elem - 5MHz, 40 Lead CERDIP	2958
C	MD82C52/7	5962-9581701VXC	CMOS Serial Controller Interface w/ Class V - 28 Lead CDIP	2950
C	MD82C52/B	8501501XA	CMOS Serial Controller Interface- 28 Lead CERDIP	2950
N	MD82C54-10/B		CMOS Programmable Interval Timer - 10MHz, 24 Lead CDIP	2970
N	MD82C54-12/B		CMOS Programmable Interval Timer - 12MHz, 24 Lead CDIP	2970
C	MD82C54/B	8406501JA	CMOS Programmable Interval Timer - 8MHz, 24 Lead CDIP	2970
C	MD82C55A-5/B	8406601QA	CMOS Programmable Peripheral I/F - 5MHz, 40 Lead CDIP	2969
C	MD82C55A/B	8406602QA	CMOS Programmable Peripheral I/F - 8MHz, 40 Lead CDIP	2969
N	MD82C59A-12/B		CMOS Interrupt Controller - 12MHz, 28 Lead CERDIP	2784
C	MD82C59A-5/B	5962-8501601YA	CMOS Interrupt Controller - 5MHz, 28 Lead CERDIP	2784
C	MD82C59A/7	5962-9571801VXC	CMOS Interrupt Controller, w/ Class V, 28 Lead CERDIP	2784
C	MD82C59A/B	5962-8501602YA	CMOS Interrupt Controller - 8MHz, 28 Lead CERDIP	2784
C	MD82C82/7	5962-9571601VRC	CMOS Octal Latching Channel Bus Driver, w/ Class V	2975

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
C	MD82C82/B	8406701RA	CMOS Octal Latching Channel Bus Driver - 20 Lead CERDIP	2975
C	MD82C83H/B	8406702RA	CMOS Inverting Octal Latching Channel Driver - 20 Lead CDIP	2971
C	MD82C84A/7	5962-9571501VVC	CMOS Clock Generator - 8MHz, w/ Class V - 20 Lead CDIP	2974
C	MD82C84A/B	8406801VA	CMOS Clock Generator - 8MHz, 20 Lead CERDIP	2974
N	MD82C85/B		CMOS Static Clock Controller - 8MHz, 24 Lead CERDIP	2976
C	MD82C86H/7	5962-9571701VRC	CMOS Octal Transceiver - 5MHz, w/ Class V - 20 Lead CDIP	2977
C	MD82C86H-5/B	5962-8757701RA	CMOS Octal Transceiver - 5MHz, 20 Lead CERDIP	2977
C	MD82C87H-5/B	5962-8757702RA	CMOS Octal Transceiver - 5MHz, 20 Lead CERDIP	2978
C	MD82C88/7	5962-9672701VRC	CMOS Bus Controller - 8MHz, w/ Class V - 20 Lead CERDIP	2979
C	MD82C88/B	8406901RA	CMOS Bus Controller - 8MHz, 20 Lead CERDIP	2979
C	MD82C89/B	5962-8552801RA	CMOS Bus Arbiter - 8MHz, 20 Lead CERDIP	2980
C	MG80C286-10/883	5962-9067801MX	CMOS 16-Bit CPU - 10MHz, 5.0V, 68 Lead PGA	2948
C	MG80C286-12/883	5962-9067802MX	CMOS 16-Bit CPU - 12MHz, 5.0V, 68 Lead PGA	2948
C	MR80C86-2/883	8405202XA	CMOS 16-Bit CPU - 8MHz, 44 Lead LCC	2957
N	MR80C86-2/B		CMOS 16-Bit CPU - 8MHz, 44 Lead LCC	2957
C	MR80C86/883	8405201XA	CMOS 16-Bit CPU - 5MHz, 44 Lead LCC	2957
N	MR80C86/B		CMOS 16-Bit CPU - 5MHz, 44 Lead LCC	2957
C	MR80C88-2/883		CMOS 8/16-Bit CPU - 8MHz, 44 Lead LCC	2949
N	MR80C88-2/B		CMOS 8/16-Bit CPU - 8MHz, 44 Lead LCC	2949
C	MR80C88/883	5962-8601601XA	CMOS 8/16-Bit CPU - 5MHz, 44 Lead LCC	2949
N	MR80C88/B		CMOS 8/16-Bit CPU - 5MHz, 44 Lead LCC	2949
N	MR82C237-12/B		CMOS DMA Controller - 12MHz, 5.0V, 44 Lead LCC	2965
C	MR82C237/B	5962-9054302MXA	CMOS DMA Controller - 8MHz, 5.0V, 44 Lead LCC	2965
N	MR82C37A-12/B		CMOS DMA Controller - 12MHz, 5.0V, 44 Lead LCC	2967
C	MR82C37A-5/B	5962-9054301MXA	CMOS DMA Controller - 5MHz, 44 Lead LCC	2967
N	MR82C37A/B		CMOS DMA Controller - 8MHz, 44 Lead LCC	2967
C	MR82C52/B	85015013A	CMOS Serial Comm I/F - 28 Lead LCC	2950
N	MR82C54-10/B		CMOS Programmable Interval Timer - 10MHz, 28 Lead LCC	2970
N	MR82C54-12/B		CMOS Programmable Interval Timer - 12MHz, 28 Lead LCC	2970
C	MR82C54/B	84065013A	CMOS Programmable Interval Timer - 8MHz, 28 Lead LCC	2970
N	MR82C55A-5/B		CMOS Programmable Peripheral I/F - 5MHz, 44 Lead LCC	2969
C	MR82C55A/B	8406602XA	CMOS Programmable Peripheral I/F - 8MHz, 44 Lead LCC	2969
N	MR82C59A-12/B		CMOS Interrupt Controller - 8MHz, 28 Lead LCC	2784
C	MR82C59A-5/B	8406601XA	CMOS Interrupt Controller - 5MHz, 28 Lead LCC	2784
C	MR82C59A/B	5962-85016023A	CMOS Interrupt Controller - 8MHz, 28 Lead LCC	2784
C	MR82C82/B	84067012A	CMOS Octal Latchable Bus Driver - 20 Lead LCC	2975
C	MR82C83H/B	84067022A	CMOS Inverting Octal Latchable Driver - 20 Lead LCC	2971
C	MR82C84A/B	84068012A	CMOS Clock Generator - 8MHz, 20 Lead LCC	2974
N	MR82C85/B		CMOS Static Clock Controller - 8MHz, 28 Lead LCC	2976
C	MR82C86H-5/B	5962-87577012A	CMOS Octal Inverting Transceiver - 5MHz, 20 Lead LCC	2977
C	MR82C87H-5/B	5962-87577022A	CMOS Octal Inverting Transceiver - 5MHz, 20 Lead LCC	2978
C	MR82C88/B	84069012A	CMOS Bus Controller - 8MHz, 20 Lead LCC	2979
C	MR82C89/B	5962-85528012A	CMOS Bus Arbiter- 8MHz, 20 Lead LCC	2980
C	RTX2000GM-8/883		Microcontroller - 8MHz, 84 pin CPGA	2447
N	SP720MD		ESD Protection Array - 16 Lead CERDIP	3683

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COMPLIANT OR NON-COMPLIANT	MARKETING PART NUMBER	REFERENCE NUMBER	DESCRIPTION	FILE NO.
N	SP720MD-8		ESD Protection Array - 16 Lead CERDIP	3683
N	SM720MM		ESD Protection Array - 28 Lead LCC	3683
N	SP720MM-8		ESD Protection Array - 28 Lead LCC	3683
C	V12ZTX1		TX MIL MOV	-
C	V12ZTX2		TX MIL MOV	-
C	V130LTX10A		TX MIL MOV	-
C	V130LTX2		TX MIL MOV	-
C	V130LTX20B		TX MIL MOV	-
C	V150LTX10A		TX MIL MOV	-
C	V150LTX2		TX MIL MOV	-
C	V150LTX20B		TX MIL MOV	-
C	V22ZTX1		TX MIL MOV	-
C	V22ZTX3		TX MIL MOV	-
C	V24ZTX50		TX MIL MOV	-
C	V250LTX20A		TX MIL MOV	-
C	V250LTX4		TX MIL MOV	-
C	V250LTX40B		TX MIL MOV	-
C	V33ZTX1		TX MIL MOV	-
C	V33ZTX5		TX MIL MOV	-
C	V33ZTX70		TX MIL MOV	-
C	V420LTX20A		TX MIL MOV	-
C	V420LTX40B		TX MIL MOV	-
C	V480LTX40A		TX MIL MOV	-
C	V480LTX80B		TX MIL MOV	-
C	V510LTX40A		TX MIL MOV	-
C	V510LTX80B		TX MIL MOV	-
C	V68ZTX10		TX MIL MOV	-
C	V68ZTX2		TX MIL MOV	-
C	V82ZTX12		TX MIL MOV	-
C	V82ZTX2		TX MIL MOV	-
C	V8ZTX1		TX MIL MOV	-
C	V8ZTX2		TX MIL MOV	-

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Multimedia

Introduction

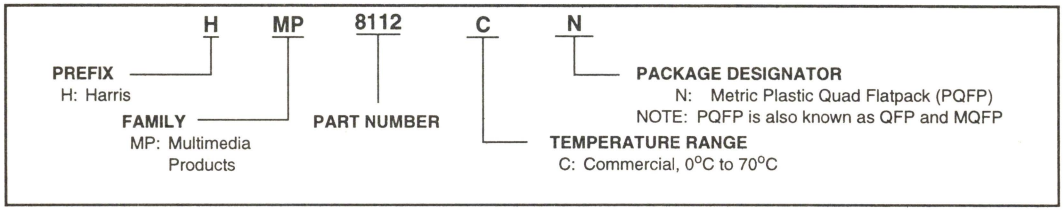
Our portfolio of multimedia circuits, focusing on the capture, processing and playback of video and audio data, are designed to offer high performance solutions for your next multimedia system.

We thoroughly understand the mixed signal and digital domains of both audio and video processing including compression standards.

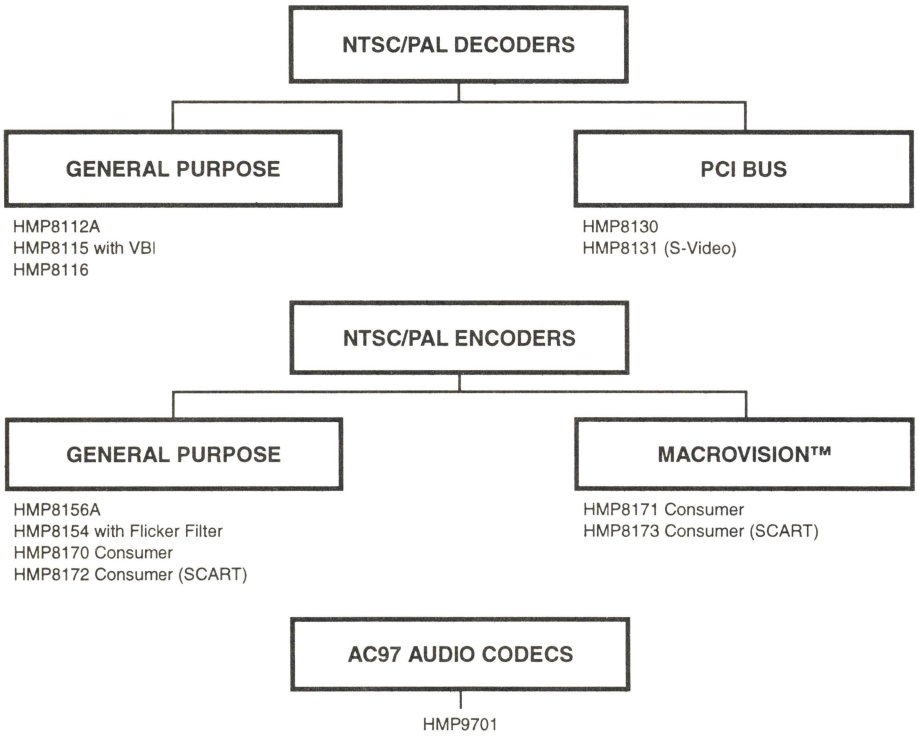
Combining this knowledge with our advanced DSP technology, mixed signal capabilities, and our excellent circuit processes, we provide circuits that perform the advanced functions you require at levels you've never seen before.

Multimedia Ordering Nomenclature Guide

HMP TYPES



Multimedia Selection Trees



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Multimedia Selection Guide and Evaluation Boards

PART NUMBER	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	DOCUMENT #
HMP8112A	HMP8112EVAL2	HMP8112A Decoder/PCI Reference Design Platform (PCI Bus)	AN9709, AN9710, AN9644
HMP8112A	HMP8156EVAL2	HMP8112A, HMP8156A Framegrabber Platform for Encoder and Decoder (ISA Bus)	AN9721
HMP8112A, HMP8115, HMP8116	HMPVIDEVAL/ISA	HMP8115, HMP8154 Framegrabber Platform for Encoder and Decoder	AN9716, AN9717, AN9727, AN9728, AN9738
HMP8154	HMP8154EVAL1	HMP8154 Encoder Daughter-Card Platform	AN9743, LC97597
HMP8154	HMP8154EVAL2	HMP8112A, HMP8156A Framegrabber Platform for Encoder and Decoder (ISA Bus)	AN9721
HMP8156A	HMP8156EVAL1	HMP8156A Encoder Daughter-Card Platform	LC97597
HMP8156A	HMP8156EVAL2	HMP8112A, HMP8156A Framegrabber Platform for Encoder and Decoder (ISA Bus)	AN9721
HMP8154, HMP8156A	HMPVIDEVAL/ISA	HMP8115, HMP8154 Framegrabber Platform for Encoder and Decoder	AN9721
HMP8170, HMP8171, HMP8172, HMP8173	HMP8170EVAL1, HMP8171EVAL1, HMP8172EVAL1, HMP8173EVAL1	HMP8170 Encoder Daughter-Card Platform, HMP8171 Encoder Daughter-Card Platform, HMP8172 Encoder Daughter-Card Platform, HMP8173 Encoder Daughter-Card Platform	AN9743
ADDITIONAL EVALUATION BOARDS THAT WILL BE ACTIVE IN JANUARY 1998			
HMP8131	HMP8130/31MDK	H.323/4 Framegrabber, PC-TV and Video Editing Manufacturers Development Kit	-
HMP9701	HMP9701EVAL2	AC '97 Audio CODEC Reference Design (PCI Bus)	-

Multimedia Packaging Selection Guide

PART NUMBER	PQFP	DOCUMENT NO.
HMP8112ACN, HMP8115	Q80.14x20	4221
HMP8156ACN, HMP8154, HMP8170, HMP8171, HMP8172, HMP8173	Q64.14x14	4269

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Check out our Multimedia WWW Site:
http://www.semi.harris.com/mmedia/

Harris Semiconductor Multimedia Home Page
Semiconductor Solutions for Multimedia

Here is what you will find:

- Harris Multimedia Solutions
- Portfolio
- Multimedia Product Listing
- Selection Charts
- Video Decoders & Encoders
- HMP8112 NTSC/PAL Decoder Competitive Comparisons
- The Audio Answer! HMP9701
- Harris Semiconductor Overview
- Line Card
- Brochure
- Data Sheets
- Evaluation Boards
- Application Notes
- Technical Briefs

WIRELESS 15

PRODUCT SELECTION GUIDE

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Wireless Ordering Nomenclature

HX, HXX "NEW" TYPES

H A 4314B C B 96

PREFIX
H: Harris

FAMILY
A: Analog
C: Communications
FA: Ultra-High Frequency Analog
I: Data Acquisition
IN: Interface
V: Analog High Voltage

PART NUMBER

TEMPERATURE
C: 0°C to 70°C
I: -40°C to 85°C
M: -55°C to 125°C

PACKAGE DESIGNATOR
A: Shrink Small Outline Plastic (SSOP)
B: Small Outline Plastic (SOIC)
D: Ceramic Dual-In-Line Metal-Seal (SBDIP)
H: Plastic Small Outline Transistor (SOT)
J: Ceramic Dual-In-Line Frit-Seal (CERDIP)
L: Ceramic Leadless Chip Carrier (CLCC)
M: Plastic Leaded Chip Carrier (PLCC)
N: Thin Quad Flatpack (TQFP), or Metric Quad Flatpack (MQFP)
Q: Metric Plastic Quad Flatpack (MQFP), or Plastic Quad Flatpack (PQFP)
P: Dual-In-Line Plastic (PDIP)
T: Can
Y: Chip (Commercial Visual)
W: Wafer

SUFFIX
/883: Fully Compliant to MIL-STD-883 Class B/QML
96: Tape and Reel
-T: Tape and Reel

HSP TYPES

H SP XXXXX A J C - XX /883

PREFIX
H: Harris

FAMILY
SP: Signal Processing

DEVICE TYPE
43XXX: Digital Filters
45XXX: Signal Synthesis/Special Function
48XXX: Image Processing
95XX: Building Blocks
50XXX: Freq. Conversion and Modulation/ Demodulation

MASK REVISION

PACKAGE DESIGNATOR
D: Die
G: Ceramic Pin Grid Array (CPGA)
J: Plastic Leaded Chip Carrier (PLCC)
P: Dual-In-Line Plastic (PDIP)
S: Small Outline Plastic (SOIC)
V: Metric Quad Flat Pack (MQFP)
W: Wafer

TEMPERATURE RANGE
C: Commercial, 0°C to 70°C
I: Industrial, -40°C to 85°C
M: Military, -55°C to 125°C

SPEED GRADE IN MHz

HIGH-RELIABILITY DESIGNATOR
/883: -55°C to 125°C Fully Compliant to MIL-STD-883, Class B/QML

NOTE: Suffix EV, EVAL: Evaluation Kit (Available for some products)

Wireless Product Selection Tree

WIRELESS PRODUCTS

AMPs/MIXERs
LOW NOISE

HFA3421
1.7GHz - 2.3GHz LNA

HFA3424
2.4GHz - 2.5GHz LNA

HFA3600
900MHz LNA/Mixer

TRANSISTOR ARRAYS

HFA3046
5 NPN

HFA3096
3 NPN, 2 PNP

HFA3127
5 NPN

HFA3128
5 PNP

HFA3134
2 NPN

HFA3135
2 PNP

BASEBAND CIRCUITS

HFA3824
Direct Sequence Processor with ADCs

IF COMPONENTS

HFA3724
10MHz to 400MHz IF UP/Down Converter Limiters, Quad Mixer and Programmable Filters

HFA3726
10MHz to 400MHz IF UP/Down Converter Limiters, Quad Mixer and Fixed Filters

HFA3761
10MHz to 400MHz IF UP Converter AGC, Quad Mixer and Programmable Filters

HFA3763
10MHz to 400MHz IF Down Converter AGC, Quad Mixer and Programmable Filters

SYNTHESIZERS

HFA3524
2.5GHz/600MHz Dual

HFA3524A
2.5GHz/600MHz Dual Low Cost

MIXERS

HFA3101
Gilbert Ceil Mixer

HFA3102
Single Balanced Mixer

UP/DOWN CONVERTERS

HFA3624
2.4GHz LNA/Mixer + Up/Down Converter

HFA3661
2.0GHz to 2.7GHz Down Converter

HFA3663
2.0GHz to 2.3GHz Up Converter with AGC

HFA3664
2.3GHz to 2.7GHz Up Converter with AGC

RF POWER AMPLIFIERS

HFA3925
2.4GHz to 2.5GHz, 250mW

HFA3926
2.0GHz to 2.7GHz, 250mW

DIGITAL RADIO

HSP50214
Digital Down Converter

HSP50215
Digital Up Converter

Wireless Evaluation Boards

EVALUATION BOARDS

PART NUMBER	EVAL BOARD PART #	EVALUATION BOARD DESCRIPTION	DOCUMENT #
HFA3421	HFA3421EVAL	1.7GHz to 2.3GHz LNA	AN9754
HFA3424	HFA3424EVAL	2.4GHz LNA	AN9627
HFA3524	HFA3524EVAL	2.5GHz/600MHz Dual Synthesizer	AN9630
HFA3624	HFA3624EVAL	2.4GHz Up/Down Converter	AN9618
HFA3661	HFA3661EVAL	2.0GHz to 2.7GHz Down Converter	AN9747
HFA3664	HFA3664EVAL	2.3GHz to 2.7GHz Up Converter + AGC	AN9713
HFA3724	HFA3724EVAL	Quadrature 400MHz IF Modem, Programmable Cutoff	AN9622
HFA3726	HFA3726EVAL	Quadrature 400MHz IF Modem, Fixed Cutoff Frequency	AN9746
HFA3761	HFA3761EVAL	400MHz IF Demod + AGC	AN9749
HFA3763	HFA3763EVAL	400MHz IF Mod + AGC	AN9712
HFA3824	HFA3824EVAL	Direct Sequence Baseband Processor	AN9615
HFA3925	HFA3925EVAL	2.4GHz RF Power Amplifier + Switch	AN9638
HFA3926	HFA3926EVAL	2.0GHz to 2.7GHz 250mW Power Amplifier + Switch	AN9755

REFERENCE DESIGN KITS

PART NUMBER	DESCRIPTION	DOCUMENT #
PRISM1 KIT-EVAL	Radio Development Kit	AN9624
WLANKITPR1-EVAL	Software Development Kit	FN4289
PRISM1RC-EVAL	MacLess Radio Development Kit	FN4334

Wireless Selection Guide

PART NUMBER	DESCRIPTION	DOCUMENT #
HFA3046	Three 8GHz NPN Transistors Plus an NPN Differential Pair	3076
HFA3096	Three 8GHz NPN Transistors Plus Two 5.5GHz PNP Transistors	3076
HFA3101	GBP = 10GHz, h_{FE} = 70, 3.5dB Noise Figure, Gilber Cell Mixer	3663
HFA3102	GBP = 10GHz, h_{FE} = 70, 3.5dB Noise, FigureDual Long Tailed Pair	3635
HFA3127	Five Independent 8GHz NPN Transistors	3076
HFA3128	Five Independent 5.5GHz PNP Transistors	3076
HFA3134	Ultra High Frequency Matched Pair Transistors	4445
HFA3135	Ultra High Frequency Matched Pair Transistors	4445
HFA3421	Wide RF Bandwidth from 1.7GHz to 2.3GHz Low Noise Amplifier	4288
HFA3424	14dB Gain, 1.9dB Noise Figure, 2.4GHz - 2.5GHz Low Noise Amplifier	4131
HFA3524	2.5GHz/600MHz Dual Synthesizer	4062
HFA3600	Noise Figure 3.97dB at 900MHz, 19.8dB Power Gain, -16.7Bm Intercept	3655
HFA3624	2.4GHz Up/Down Converter	4066
HFA3661	2.0GHz to 2.7GHz Down Converter	4240
HFA3663	2.0GHz to 2.3GHz Up Converter + AGC	4241
HFA3664	2.3GHz to 2.7GHz Up Converter + AGC	4242
HFA3724	Quadrature 400MHz IF Modem, Programmable Cutoff	4067
HFA3726	Quadrature 400MHz IF Modem, Fixed Cutoff Frequency	4310
HFA3761	400MHz IF Demod + AGC	4236
HFA3763	400MHz IF Mod + AGC	4237
HFA3824	Direct Sequence Baseband Processor	4308
HFA3925	2.4GHz - 2.5GHz RF Power Amplifier + Switch, 250mW	4132
HFA3926	2.0GHz to 2.7GHz 250mW Power Amplifier + Switch, 250mW	4282
HSP50214	Digital Down Converter	4266
HSP50215	Digital Up Converter	4346
PRISM™ 2.4GHz Chip Set	Direct Sequence Spread Spectrum Wireless Transceiver Chip Set	4063
PRISM™ Full Duplex Radio Chip Set	Full Duplex Radio Front End For Voice and Data	4238

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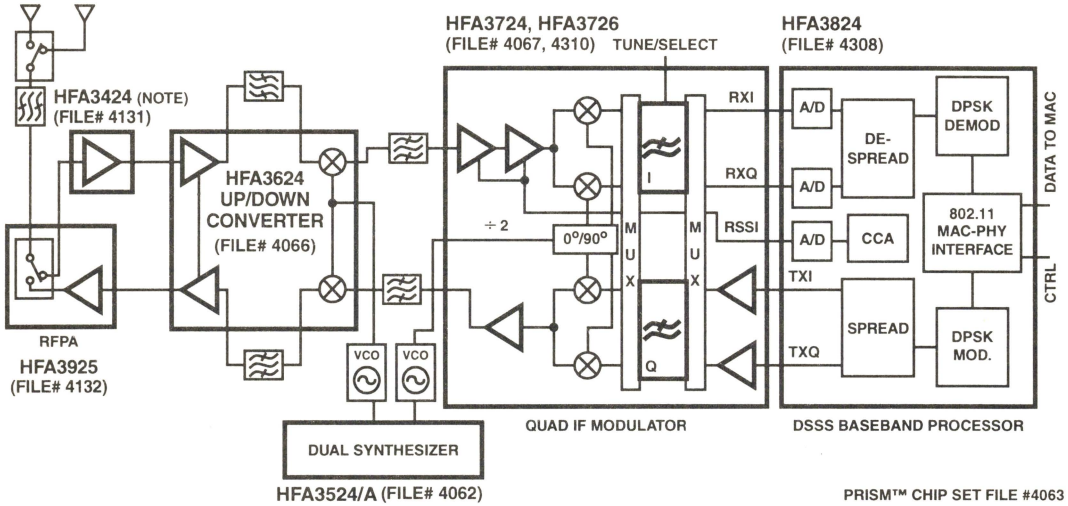
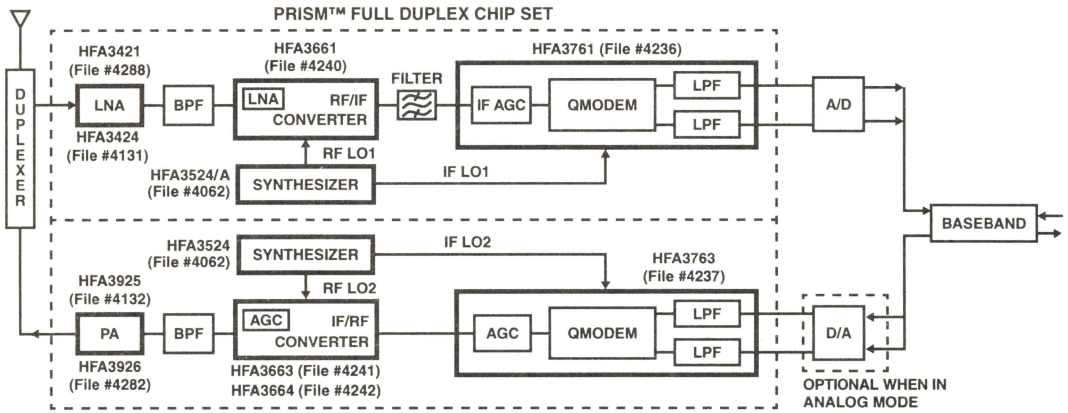
HALF DUPLEX RADIO CHIPSET



PRISM™ CHIP SET FILE #4063

NOTE: Required for systems targeting 802.11 specifications.

FULL DUPLEX RADIO CHIPSET



PRISM™ FULL DUPLEX RADIO
CHIP SET, FILE #4238

Wireless Package Selection Guide

Using the Selection Guide:

The first character of each entry indicates the package type, while the number preceding the decimal point details the package lead count. Except for Can packages, the decimal point and succeeding numbers specify the package width in inches (e.g. __.15 = 150 mil width).

PART NUMBER	SOIC	TSSOP, SSOP	MQFP	TQFP	SOT
HFA3046	M14.15				
HFA3096	M16.15				
HFA3101	M8.15				
HFA3102	M14.15				
HFA3127	M16.15				
HFA3128	M16.15				
HFA3134					P6.064
HFA3135					P6.064
HFA3421	M8.15				
HFA3424	M8.15				
HFA3524		M20.173			
HFA3600	M14.15				
HFA3624		M28.15			
HFA3661		M20.15			
HFA3663		M20.15			
HFA3664		M20.15			
HFA3724				Q80.14x14	
HFA3726				Q80.14x14	
HFA3761				Q80.14x14	
HFA3763				Q80.14x14	
HFA3824				Q48.7x7	
HFA3925		M28.15			
HFA3926		M28.15			
HSP50214			Q120.28x28		
HSP50215			Q100.14x20		

Packaging information is available in Section 16.

PACKAGING INFORMATION 16

PRODUCT SELECTION GUIDE

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HERMETIC PACKAGES FOR INTEGRATED CIRCUITS 16-3

PLASTIC PACKAGES FOR INTEGRATED CIRCUITS 16-5

POWER PACKAGES 16-8

The following tables in this section list Harris' packaging options. These tables translate the packaging number to a description. For outlines and dimensions see the Harris web site http://www.semi.harris.com/packages/ or refer to the appropriate data book.

HERMETIC PACKAGES FOR INTEGRATED CIRCUITS

PACKAGE TYPE	DESCRIPTION
A14.A	14 LEAD CERAMIC FRIT SEAL CERPACK PACKAGE
D8.3 MIL-STD-1835 CDIP2-T8 (D-4, CONFIGURATION C)	8 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D14.3 MIL-STD-1835 CDIP2-T14 (D-1, CONFIGURATION C)	14 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D16.3 MIL-STD-1835 CDIP2-T16 (D-2, CONFIGURATION C)	16 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D18.3 MIL-STD-1835 CDIP2-T18 (D-6, CONFIGURATION C)	18 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D20.3 MIL-STD-1835 CDIP2-T20 (D-8, CONFIGURATION C)	20 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D22.4 MIL-STD-1835 CDIP2-T22 (D-7, CONFIGURATION C)	22 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D22.4A	22 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D24.6 MIL-STD-1835 CDIP2-T24 (D-3, CONFIGURATION C)	24 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D24.3 MIL-STD-1835 CDIP4-T24 (D-9, CONFIGURATION C)	24 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D28.6 MIL-STD-1835 CDIP2-T28 (D-10, CONFIGURATION C)	28 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D40.6 MIL-STD-1835 CDIP2-T40 (D-5, CONFIGURATION C)	40 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
D42.6	42 LEAD CERAMIC DUAL-IN-LINE METAL SEAL PACKAGE
F8.3A MIL-STD-1835 GDIP1-T8 (D-4, CONFIGURATION A)	8 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
F14.3 MIL-STD-1835 GDIP1-T14 (D-1, CONFIGURATION A)	14 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
F16.3 MIL-STD-1835 GDIP1-T16 (D-2, CONFIGURATION A)	16 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
F18.3 MIL-STD-1835 GDIP1-T18 (D-6, CONFIGURATION A)	18 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
F20.3 MIL-STD-1835 GDIP1-T20 (D-8, CONFIGURATION A)	20 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
F22.4 MIL-STD-1835 GDIP1-T22 (D-7, CONFIGURATION A)	22 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
F24.3 MIL-STD-1835 GDIP3-T24 (D-9, CONFIGURATION A)	24 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
F24.6 MIL-STD-1835 GDIP1-T24 (D-3, CONFIGURATION A)	24 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
F28.6 MIL-STD-1835 GDIP1-T28 (D-10, CONFIGURATION A)	28 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
F40.6 MIL-STD-1835 GDIP1-T40 (D-5, CONFIGURATION A)	40 LEAD CERAMIC DUAL-IN-LINE FRIT SEAL PACKAGE
G48.A	48 LEAD CERAMIC PIN GRID ARRAY PACKAGE
G68.A MIL-STD-1835 CMGA3-P68C (P-AC)	68 LEAD CERAMIC PIN GRID ARRAY PACKAGE
G68.B MIL-STD-1835 CMGA3-P68D (P-AC)	68 LEAD CERAMIC PIN GRID ARRAY PACKAGE
G84.A MIL-STD-1835 CMGA3-P84C (P-AC)	84 LEAD CERAMIC PIN GRID ARRAY PACKAGE
G85.A MIL-STD-1835 CMGA3-P85C (P-AC)	85 LEAD CERAMIC PIN GRID ARRAY PACKAGE
G145.A MIL-STD-1835 CMGA7-P145C (P-AG)	145 LEAD CERAMIC PIN GRID ARRAY PACKAGE
J18.A	18 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
J18.B	18 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
J20.A MIL-STD-1835 CQCC1-N20 (C-2)	20 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
J20.B	20 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
J20.C MIL-STD-1835 CQCC3-N20 (C-13)	20 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
J28.A MIL-STD-1835 CQCC1-N28 (C-4)	28 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE

HERMETIC PACKAGES FOR INTEGRATED CIRCUITS (Continued)

PACKAGE TYPE	DESCRIPTION
J32.A MIL-STD-1835 CQCC1-N32 (C-12)	32 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
J44.A MIL-STD-1835 CQCC1-N44 (C-5)	44 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
J44.B	44 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
J68.A	68 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
J68.B	68 PAD CERAMIC LEADLESS CHIP CARRIER PACKAGE
K14.A MIL-STD-1835 CDFP3-F14 (F-2A, CONFIGURATION B)	14 LEAD CERAMIC METAL SEAL FLATPACK PACKAG
K14.B	14 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K16.A MIL-STD-1835 CDFP4-F16 (F-5A, CONFIGURATION B)	16 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K16.B	16 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K16.D	16 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K18.A	18 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K18.B	18 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K20.A MIL-STD-1835 CDFP4-F20 (F-9A, CONFIGURATION B)	20 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K24.A MIL-STD-1835 CDFP4-F24 (F-6A, CONFIGURATION B)	24 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K24.B	24 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K24.D TOP BRAZED	24 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K28.A MIL-STD-1835 CDFP3-F28 (F-11A, CONFIGURATION B)	28 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K28.B	28 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K28.E	28 LEAD CERAMIC SOIC FLATPACK PACKAGE
K36.A	36 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
K42.A TOP BRAZED	42 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE
R48.A	48 LEAD CERAMIC QUAD FLATPACK PACKAGE
R68.A	68 LEAD CERAMIC QUAD FLATPACK PACKAGE
R84.A	84 LEAD CERAMIC QUAD FLATPACK PACKAGE
S84.A	84 LEAD TAPE AUTOMATED BONDING PACKAGE
S156.A	156 LEAD TAPE AUTOMATED BONDING PACKAGE
T2.A	2 LEAD METAL CAN PACKAGE
T3.A	3 LEAD METAL CAN PACKAGE
T8.C MIL-STD-1835 MACY1-X8 (A1)	8 LEAD METAL CAN PACKAGE
T10.B MIL-STD-1835 MACY1-X10 (A2)	10 LEAD METAL CAN PACKAGE
T10.C	10 LEAD METAL CAN PACKAGE
T12.B	12 LEAD METAL CAN PACKAGE
T12.C	12 LEAD METAL CAN PACKAGE

PLASTIC PACKAGES FOR INTEGRATED CIRCUITS

PACKAGE TYPE	DESCRIPTION
E8.3 (JEDEC MS-001-BA ISSUE D)	8 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E14.3 (JEDEC MS-001-AA ISSUE D)	14 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E16.3 (JEDEC MS-001-BB ISSUE D)	16 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E16.3A-S	16 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E18.3 (JEDEC MS-001-BC ISSUE D)	18 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E20.3 (JEDEC MS-001-AD ISSUE D)	20 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E22.4 (JEDEC MS-010-AA ISSUE C)	22 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E24.3 (JEDEC MS-001-AF ISSUE D)	24 LEAD NARROW BODY DUAL-IN-LINE PLASTIC PACKAGE
E24.4-S	24 LEAD DUAL-IN-LINE PLASTIC PACKAGE (400 MIL)
E24.6 (JEDEC MS-011-AA ISSUE B)	24 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E28.3 (JEDEC MS-001-BF ISSUE D)	28 LEAD NARROW BODY DUAL-IN-LINE PLASTIC PACKAGE
E28.6 (JEDEC MS-001-BF ISSUE D)	28 LEAD NARROW BODY DUAL-IN-LINE PLASTIC PACKAGE
E28.6A-S	28 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E40.6 (JEDEC MS-011-AC ISSUE B)	40 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E42.6	42 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E42.6A-S	42 LEAD DUAL-IN-LINE PLASTIC PACKAGE
E42.6B-S	42 LEAD SHRINK DUAL-IN-LINE PLASTIC PACKAGE
E42.6C	42 LEAD SHRINK DUAL-IN-LINE PLASTIC PACKAGE
E48.6 (JEDEC MS-011-AD ISSUE B)	48 LEAD DUAL-IN-LINE PLASTIC PACKAGE
M8.15 (JEDEC MS-012-AA ISSUE C)	8 LEAD NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M14.15 (JEDEC MS-012-AB ISSUE C)	14 LEAD NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M14.15-P	14 LEAD NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M16.15 (JEDEC MS-012-AC ISSUE C)	16 LEAD NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M16.15A	16 LEAD SHRINK NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M16.15A-P	16 LEAD SHRINK NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M16.15-P	16 LEAD NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M16.2-S	16 LEAD SMALL OUTLINE PLASTIC PACKAGE (200 MIL)
M16.209 (JEDEC MO-150-AC ISSUE B)	16 LEAD SHRINK SMALL OUTLINE PLASTIC PACKAGE
M16.3 (JEDEC MS-013-AA ISSUE C)	16 LEAD WIDE BODY SMALL OUTLINE PLASTIC PACKAGE
M16.3-P	16 LEAD WIDE BODY SMALL OUTLINE PLASTIC PACKAGE
M18.3 (JEDEC MS-013-AB ISSUE C)	18 LEAD WIDE BODY SMALL OUTLINE PLASTIC PACKAGE
M20.15	20 LEAD SHRINK NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M20.15-P	20 LEAD SHRINK NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M20.173	20 LEAD THIN SHRINK SMALL OUTLINE PLASTIC PACKAGE
M20.209 (JEDEC MO-150-AE ISSUE B)	20 LEAD SHRINK SMALL OUTLINE PLASTIC PACKAGE

PLASTIC PACKAGES FOR INTEGRATED CIRCUITS (Continued)

PACKAGE TYPE	DESCRIPTION
M20.3 (JEDEC MS-013-AC ISSUE C)	20 LEAD WIDE BODY SMALL OUTLINE PLASTIC PACKAGE
M20.3-P	20 LEAD WIDE BODY SMALL OUTLINE PLASTIC PACKAGE
M8.15A	8 LEAD POWER SMALL OUTLINE PLASTIC PACKAGE
M20.3A	20 LEAD POWER SMALL OUTLINE PLASTIC PACKAGE
M20.433	20 LEAD POWER SMALL OUTLINE PLASTIC PACKAGE
M24.433	24 LEAD POWER SMALL OUTLINE PLASTIC PACKAGE
M24.2-S	24 LEAD SMALL OUTLINE PLASTIC PACKAGE (200 MIL)
M24.209 (JEDEC MO-150-AG ISSUE B)	24 LEAD SHRINK SMALL OUTLINE PLASTIC PACKAGE
M24.3 (JEDEC MS-013-AD ISSUE C)	24 LEAD WIDE BODY SMALL OUTLINE PLASTIC PACKAGE
M24.3-P	24 LEAD WIDE BODY SMALL OUTLINE PLASTIC PACKAGE
M24.15-P	24 LEAD SHRINK NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M28.15	28 LEAD SHRINK NARROW BODY SMALL OUTLINE PLASTIC PACKAGE
M28.209 (JEDEC MO-150-AH ISSUE B)	28 LEAD SHRINK SMALL OUTLINE PLASTIC PACKAGE
M48.240-P	48 LEAD THIN SHRINK SMALL OUTLINE PLASTIC PACKAGE
M48.300-P	48 LEAD SHRINK SMALL OUTLINE PLASTIC PACKAGE
M56.240-P	56 LEAD THIN SHRINK SMALL OUTLINE PLASTIC PACKAGE
M56.300-P	56 LEAD SHRINK SMALL OUTLINE PLASTIC PACKAGE
M28.3 (JEDEC MS-013-AE ISSUE C)	28 LEAD WIDE BODY SMALL OUTLINE PLASTIC PACKAGE
M28.3A-S	28 LEAD SMALL OUTLINE PLASTIC PACKAGE (300 MIL)
N20.35 (JEDEC MS-018AA ISSUE A)	20 LEAD PLASTIC LEADED CHIP CARRIER PACKAGE
N28.45 (JEDEC MS-018AB ISSUE A)	28 LEAD PLASTIC LEADED CHIP CARRIER PACKAGE
N44.65 (JEDEC MS-018AC ISSUE A)	44 LEAD PLASTIC LEADED CHIP CARRIER PACKAGE
N68.95 (JEDEC MS-018AE ISSUE A)	68 LEAD PLASTIC LEADED CHIP CARRIER PACKAGE
N84.1.15 (JEDEC MS-018AF ISSUE A)	84 LEAD PLASTIC LEADED CHIP CARRIER PACKAGE
P6.064	6 LEAD SMALL OUTLINE TRANSISTOR PLASTIC PACKAGE
Q32.7x7-S	32 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q44.10x10 (JEDEC MO-108AA-2 ISSUE A)	44 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q48.7x7 (JEDEC MO-136AE ISSUE C)	48 LEAD THIN PLASTIC QUAD FLATPACK PACKAGE
Q48.7x7A (JEDEC MS-026BBC ISSUE A)	48 LEAD THIN PLASTIC QUAD FLATPACK PACKAGE
Q48.7x7-S	48 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q48.12x12-S	48 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q64.10x10-S	64 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q64.14x14 (JEDEC MO-108BD-2 ISSUE A)	64 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q64.14x20-S	64 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q80.14x14 (JEDEC MO-136BQ ISSUE C)	80 LEAD THIN PLASTIC QUAD FLATPACK PACKAGE

PLASTIC PACKAGES FOR INTEGRATED CIRCUITS (Continued)

PACKAGE TYPE	DESCRIPTION
Q80.14x20 (JEDEC MO-108CB-1 ISSUE A)	80 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q80.14x20-S	80 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q100.14x20 (JEDEC MO-108CC-1 ISSUE A)	100 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q120.28x28 (JEDEC MO-108DA-1 ISSUE A)	120 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q128.28x28 (JEDEC MO-108DB-1 ISSUE A)	128 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q144.20x20	144 LEAD THIN PLASTIC QUAD FLATPACK PACKAGE
Q144.28x28 (JEDEC MO-108DC-1 ISSUE A)	144 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q160.28x28 (JEDEC MO-108DD-1 ISSUE A)	160 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q208.28x28	208 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Q256.28x28	256 LEAD METRIC PLASTIC QUAD FLATPACK PACKAGE
Z3.05 (JEDEC STYLE TO-92 MODIFIED)	3 LEAD PLASTIC SINGLE-IN-LINE PACKAGE
Z3.1A (JEDEC STYLE TO-202 MODIFIED)	3 LEAD SHORT TAB SINGLE-IN-LINE PLASTIC PACKAGE
Z3.1B	3 LEAD PLASTIC SINGLE-IN-LINE PACKAGE
Z3.1C (JEDEC TO-220AB ISSUE J)	3 LEAD PLASTIC SINGLE-IN-LINE PACKAGE
Z3.1D	3 LEAD PLASTIC SINGLE-IN-LINE PACKAGE SURFACE MOUNT "GULLWING" LEAD FORM
Z5.067 (JEDEC TS-001AA ISSUE A)	5 LEAD PLASTIC SINGLE-IN-LINE PACKAGE
Z5.067A	5 LEAD PLASTIC SINGLE-IN-LINE PACKAGE SURFACE MOUNT "GULLWING" LEAD FORM
Z5.067B	5 LEAD PLASTIC SINGLE-IN-LINE PACKAGE STAGGERED VERTICAL LEAD FORM
Z5.067C (ALTERNATE VERSION)	5 LEAD PLASTIC SINGLE-IN-LINE PACKAGE
Z7.05A	7 LEAD PLASTIC SINGLE-IN-LINE PACKAGE STAGGERED SURFACE MOUNT "GULLWING" LEAD FORM
Z7.05B	7 LEAD PLASTIC SINGLE-IN-LINE PACKAGE SURFACE MOUNT "GULLWING" LEAD FORM
Z7.05C	7 LEAD PLASTIC SINGLE-IN-LINE PACKAGE STAGGERED VERTICAL LEAD FORM
Z9.1	9 LEAD SINGLE-IN-LINE PLASTIC PACKAGE
Z15.05A (JEDEC MO-048 AB ISSUE A)	15 LEAD PLASTIC SINGLE-IN-LINE PACKAGE STAGGERED VERTICAL LEAD FORM
Z15.05B	15 LEAD PLASTIC SINGLE-IN-LINE PACKAGE SURFACE MOUNT "GULL-WING" LEAD FORM
18 Pin CLCC	18 PIN CERAMIC LEADLESS CHIP CARRIER
HexDIP	4 PIN DUAL-IN-LINE PLASTIC PACKAGE

POWER PACKAGES

PACKAGE TYPE	DESCRIPTION
MO-093AA	5 LEAD JEDEC MO-093AA PLASTIC PACKAGE
MO-153AA	16mm TAPE AND REEL
MS-012AA	8 LEAD JEDEC MS-012AA SMALL OUTLINE PLASTIC PACKAGE
MS-012AA	12mm TAPE AND REEL
SMD1	3 PAD CERAMIC LEADLESS CHIP CARRIER
SMD2	3 PAD CERAMIC LEADLESS CHIP CARRIER
SOT-223 (TO-261AA)	SMALL OUTLINE TRANSISTOR
SOT-223	12mm TAPE AND REEL
TO-202 Modified	2 LEAD JEDEC STYLE TO-202 SHORT TAB PLASTIC PACKAGE
TO-202 Modified	3 LEAD JEDEC STYLE TO-202 SHORT TAB PLASTIC PACKAGE
TO-204AA	JEDEC TO-204AA HERMETIC STEEL PACKAGE
TO-204AE	JEDEC TO-204AE HERMETIC STEEL PACKAGE
TO-205AF	3 LEAD JEDEC TO-205AF HERMETIC METAL CAN PACKAGE
TO-218	SINGLE LEAD JEDEC STYLE TO-218 PLASTIC PACKAGE
TO-218AC	3 LEAD JEDEC TO-218AC PLASTIC PACKAGE
TO-220AB	3 LEAD JEDEC TO-220AB PLASTIC PACKAGE
TO-220AB (Alternate Version)	3 LEAD JEDEC TO-220AB PLASTIC PACKAGE
TO-220AC	2 LEAD JEDEC TO-220AC PLASTIC PACKAGE (FOR RECTIFIERS ONLY)
TO-247	2 LEAD JEDEC STYLE TO-247 PLASTIC PACKAGE (FOR RECTIFIERS ONLY)
TO-247	3 LEAD JEDEC STYLE TO-247 PLASTIC PACKAGE
TO-247	5 LEAD JEDEC STYLE TO-247 PLASTIC PACKAGE
TO-251	2 LEAD JEDEC STYLE TO-251 PLASTIC PACKAGE (FOR RECTIFIERS ONLY)
TO-252	2 LEAD SURFACE MOUNT JEDEC TO-252 PLASTIC PACKAGE (FOR RECTIFIERS ONLY)
TO-251AA	3 LEAD JEDEC TO-251AA PLASTIC PACKAGE
TO-252AA	SURFACE MOUNT JEDEC TO-252AA PLASTIC PACKAGE
TO-252	16mm TAPE AND REEL
TO-252AA	16mm TAPE AND REEL
TO-254AA	3 LEAD JEDEC TO-254AA HERMETIC METAL PACKAGE
TO-257AA	3 LEAD JEDEC TO-257AA HERMETIC METAL PACKAGE
TO-258AA	3 LEAD JEDEC TO-258AA HERMETIC METAL PACKAGE
TO-262	2 LEAD JEDEC STYLE TO-262 PLASTIC PACKAGE (FOR RECTIFIERS ONLY)
TO-263	SURFACE MOUNT JEDEC STYLE TO-263 PLASTIC PACKAGE (FOR RECTIFIERS ONLY)
TO-262AA	3 LEAD JEDEC TO-262AA PLASTIC PACKAGE
TO-263AB	SURFACE MOUNT JEDEC TO-263AB PLASTIC PACKAGE
TO-263	24mm TAPE AND REEL
TO-263AB	24mm TAPE AND REEL
TS-001AA (Alternate Version)	5 LEAD JEDEC TS-001AA PLASTIC PACKAGE

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ON-LINE SERVICES

PRODUCT SELECTION GUIDE

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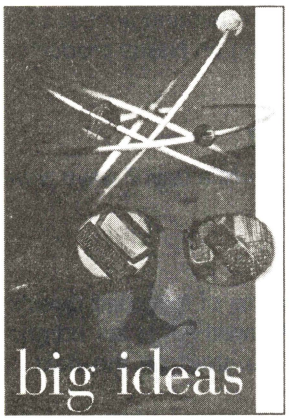

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AnswerFAX is Harris' automated fax response system. It gives you on-demand access to a full library of the latest data sheets, application notes, and other information on Harris products.

• • •

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- Linear/Telecom Products
- Discrete & Intelligent Power Products
- CMOS Logic Products
- Data Acquisition Products
- Microprocessor Products
- Application Notes

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Please refer to next page for a map to AnswerFAX.

Your Map to Harris AnswerFAX

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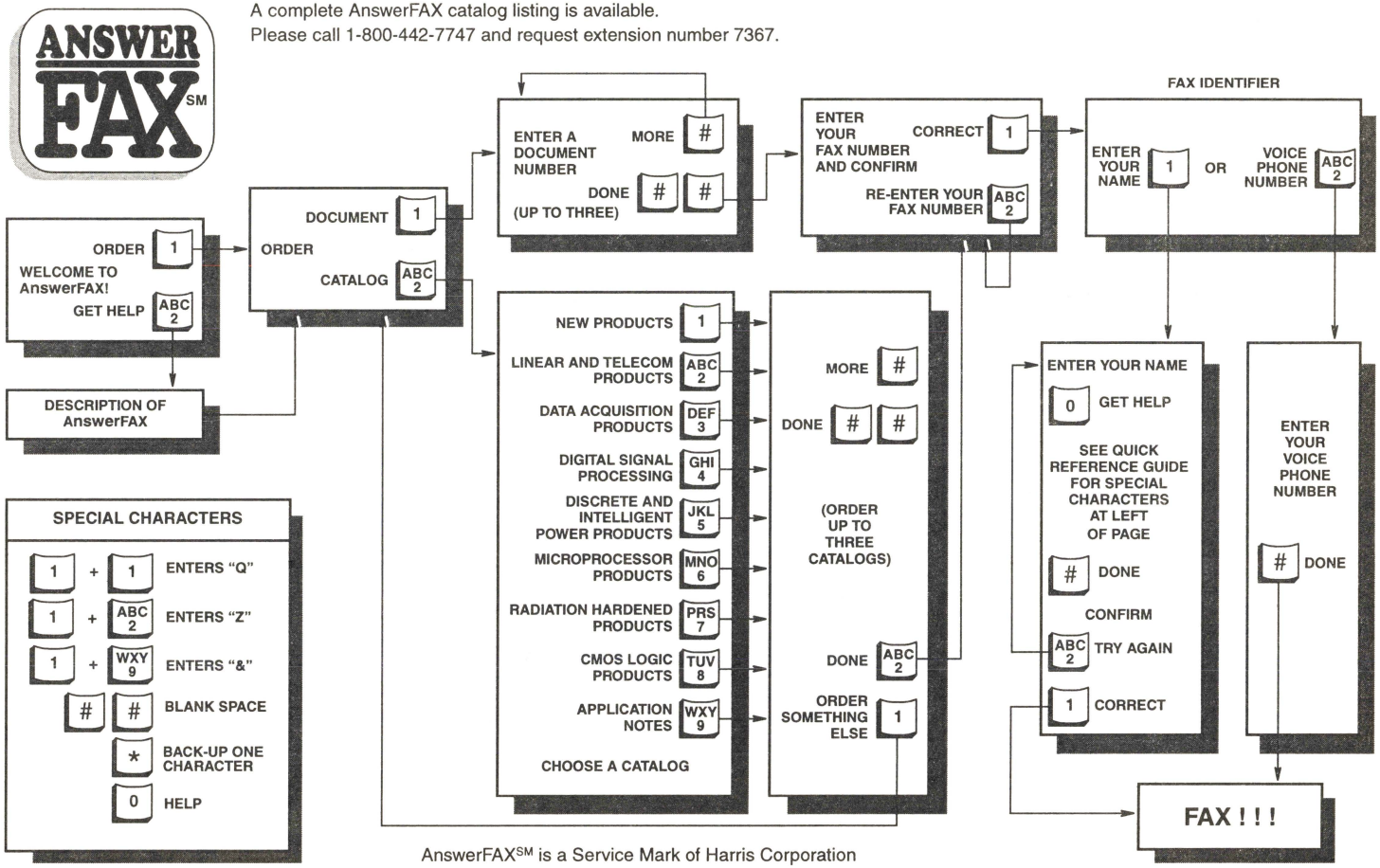

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Data Books Available Now

✓	PUB. NUMBER	DATA BOOK/DESCRIPTION
	7004	Complete Set of Commercial Harris Data Books
	7005	Complete Set of Commercial and Military Harris Data Books
	DB223B	**POWER MOSFETs** (1994: 1,328pp) This data book contains detailed technical information including standard power MOSFETs (the popular RF-series types, the IRF-series of industry replacement types, and JEDEC types), MegaFETs, logic-level power MOSFETs (L2FETs), ruggedized power MOSFETs, advanced discrete, high-reliability and radiation-hardened power MOSFETs.
	DB316	**POWER MOSFET DATA BOOK SUPPLEMENT** (1996: 380pp) This data book contains the data sheets of recently introduced products and also updates some of the data sheets in the Power MOSFET Data Book DB223B. These data sheets contain the detailed specification for these products.
	DB235B	**RADIATION HARDENED** (1993: 2,232pp) The Harris radiation-hardened products include the CD4000, HCS/HCTS and ACS/ACTS logic families, SRAMs, PROMs, op amps, analog multiplexers, the 80C85/80C86 microprocessor family, analog switches, gate arrays, standard cells and custom devices.
	DB260.2	**CDP6805 CMOS MICROCONTROLLERS & PERIPHERALS** (1995: 436pp) This data book represents the full line of Harris Semiconductor CDP6805 products for commercial applications and supersedes previously published CDP6805 data books under the Harris, GE, RCA or Intersil names.
	DB301.3	**DATA ACQUISITION** (1997: 1,318pp) Product specifications on A/D converters (display, integrating, successive approximation, flash); D/A converters, switches, multiplexers, and other products.
	DB302B	**DIGITAL SIGNAL PROCESSING** (1994: 528pp) Product specifications on one-dimensional and two-dimensional filters, signal synthesizers, multipliers, special function devices (such as address sequencers, binary correlators, histogrammer).
	DB303.1	**MICROPROCESSOR PRODUCTS** (1997: 1,260pp) In the ever-changing IC marketplace, Harris Semiconductor has made a strong business commitment to continue servicing mature CMOS products and technologies. As always, we will supply mature, standard architecture microprocessor families for markets including cellular communications, PABX, networking systems, EDP peripherals, medical and avionics instrumentation.
	DB304.1	**INTELLIGENT POWER ICs** (1994: 946pp) This data book includes a complete set of data sheets for product specifications, application notes with design details for specific applications of Harris products, and a description of the Harris quality and high reliability program.
	DB309.1	**MCT/IGBT/DIODES** (1995: 706pp) This MCT/IGBT/Diodes data book represents the full line of these products made by Harris Semiconductor Discrete Power Products for commercial applications.
	DB319	**HARRIS IGBT UFS SERIES SUPPLEMENT** (1997: 164pp) The UFS series IGBT (Insulated Gate Bipolar Transistor) Data Book Supplement represents a new generation of IGBT products from Harris Semiconductor Discrete Power Products for commercial applications. This data book supplement describes Harris Semiconductor's line of UFS (Ultra Fast Switching) IGBTs.
	DB314	**SIGNAL PROCESSING NEW RELEASES** (1995: 690pp) This data book represents the newest products made by Harris Semiconductor Data Acquisition Products, Linear Products, Telecom Products and Digital Signal Processing Products for commercial applications.
	DB315.1	**CROSS-REFERENCE GUIDE** (1997: 368pp) Listing of semiconductor products that are second-sourced by Harris Semiconductor.
	DB317	**COMMUNICATIONS DATA BOOK** (1997: 708pp) Technical information including data sheets and application notes for a variety of Harris Integrated Circuits targeted for the communications industry. These products include the PRISM 2.4GHz DSSS Wireless Transceiver Chip Set, the new HC5517 Ringing SLIC as well as Standard Linear, Data Acquisition, DSP and Power products.
	DB321	**APPLICATIONS FOR COMMUNICATION ICs** (1997: 392pp) Application Notes and Tech Briefs for Harris communication products that range from wireless PRISM™ 2.4GHz WLAN chip set to Telecom HC5517 ringing SLIC. Also Data Acquisition and Digital Signal Processing.
	DB318	**LPT/FCT CMOS LOGIC EXPANSION** (1997: 620pp) This data book fully describes Harris Semiconductor's LPT and FCT CMOS Logic ICs. It includes a complete set of data sheets for product specifications, application notes and techbriefs with design details for specific applications of Harris products, and a description of the Harris Quality and Reliability program.
	DB450.5	**TRANSIENT VOLTAGE SUPPRESSION DEVICES** (1998: 440pp) The products presented in this data book are designed to suppress voltage transients induced in electrical/electronic systems and circuits from common sources such as ESD, EFT, Lightning Surge, Auto Load Dump, Inductive load switching, capacitor bank switching, noise bursts, etc. Harris TVS devices are comprised of six distinct technologies in order to best fit the application and its particular transient concerns.
	DB500.3	**LINEAR ICs** (1996/97: 1446pp) Harris offers an extensive line of Linear components including: High Speed and General Purpose Op Amps, Comparators, Sample/Hold Amps, Video Crosspoint Switches, Special Analog Circuits and Transistor Arrays.
	Analog Military	**ANALOG MILITARY** (1989: 1,264pp) This data book describes Harris' military line of Linear, Data Acquisition, and Telecommunications circuits.
	DB312	**ANALOG MILITARY DATA BOOK SUPPLEMENT** (1994: 432pp) The 1994 Military Data Book Supplement, combined with the 1989 Analog Military Product Data Book, contain detailed technical information on the extensive line of Harris Semiconductor Linear and Data Acquisition products for Military (MIL-STD-883, DESC SMD and JAN) applications and supersedes all previously published Linear and Data Acquisition Military data books. For applications requiring Radiation Hardened products, please refer to the 1993 Harris Radiation Hardened Product Data Book (document #DB235B)
	PSG201.25	**PRODUCT SELECTION GUIDE** (1998: 632pp) Key product information on *all* Harris Semiconductor devices. Includes an alphanumeric part number index, new products, nomenclature guides, selection trees and complete selection guides. Military/Space cross reference guide.
	SG103	**CMOS LOGIC SELECTION GUIDE** (1994: 288pp) This product selection guide contains technical information on Harris Semiconductor High Speed 54/74 CMOS Logic Integrated Circuits for commercial, industrial and military applications. It covers Harris' High Speed CMOS Logic HC/HCT Series, AC/ACT Series, BiCMOS Interface Logic FCT Series and CMOS Logic CD4000B Series.
	BR-057.3	**AnswerFAX CATALOG** (Fall 1996: 112pp) A Complete AnswerFAX Catalog listing.

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PRODUCT SELECTION GUIDE

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FAX: 55-19-236-9834

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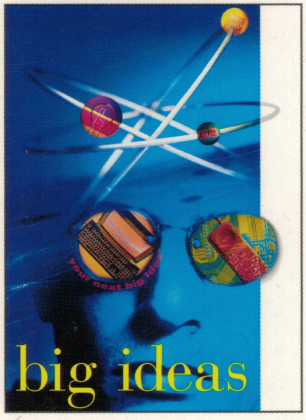

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